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THE HOMESTEAD (Frontispiece, Every Day Cyclopedia.)

THE WORLD'S CYCLOPEDIA

OF

USEFUL KNOWLEDGE

FOR THE

FARMER, MECHANIC, BUSINESS MAN AND HOUSEKEEPER.

EMBRACING THE FOLLOWING, AMONG MANY OTHER SUBJECTS:

HORSES, CATTLE, SHEEP, SWINE AND POULTRY; FARMING AND HOW TO MAKE THE FARM PAY; MECHANICAL; HOUSEHOLD ECONOMY; CURING AND STORING; HUNTING AND FISHING; KITCHEN-GARDEN; FLORICULTURE AND GREEN HOUSE; PAINTING AND TANNING; CEMENT, GLUE, PASTE; BEES, HOW TO RAISE AND MANAGE; MEDICAL OR HOME DOCTOR; LAWS OF BUSINESS; INSECTS AND FARMERS' ENEMIES; DAIRY AND BUTTER MAKING; HOUSEHOLD PESTS AND REMEDIES; NURSERY, ORCHARD AND FRUIT GARDEN; FAMILY COOK BOOK; WEEDS AND HOW TO DESTROY THEM; BUDDING, GRAFTING AND CUTTINGS; AGRICULTURAL CHEMISTRY; MINERALS AND ORES; SIMPLE TEST FOR METALS.

EDITED BY HENRY W. BRAND AND B. V. DIXON.

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F. M. HARTER,
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PREFACE.

In presenting this book to the public, we think we can say, without fear of contradiction, that any one who carefully examines it will find that it is precisely what its name indicates, — an "EVERY-DAY CYCLOPEDIA OF USEFUL KNOWLEDGE."

The Farmer will find that it is invaluable to him, because all that it treats of is told in straight-forward, plain language, without any waste of words. To acquire the knowledge required of it on any particular subject does not call for profound study; it is set forth "as plain as day," that those "who run may read;" a few words tell what is to be done, in the best and most economical manner, and with the aid of resources which are almost always within reach.

The Mechanic cannot fail to profit by the information so concisely given in the mechanical department: there are facts there also for the Farmer and Housekeeper.

The Business Man cannot turn to it at any time without learning something that he did not know before; the "*Laws of Business*" and *Interest Tables* alone are worth the price of the book. The Farmer will find much here of value to him. "Ignorance of the law excuses no man."

The Housekeeper, once she has got this book, will not be able to do without it: it will be to her a *constant companion* and a faithful friend. The Cook Book and recipe department is a model of its kind.

The various departments have been edited by men who are high authorities in the matters of which they treat, and no expense or pains have been spared to make this a reliable work.

We do not indulge in a lengthy preface — it is not needed; the book speaks for itself. All we have tried to do is to call attention to its salient points. With these few remarks we commend this work to our readers in the hope that to one and all it may prove a never failing fund of information.

THE PUBLISHERS.

AGENTS WANTED

To canvass for **Every-Day Cyclopedia of Useful Knowledge** in towns or townships not yet canvassed. Very liberal terms will be made to energetic men or women willing and not afraid to work hard. This book gives perfect satisfaction and is meeting with unparalleled success in the hands of our agents. By writing the publishers (whose address will be found at bottom of *first page*) full particulars can be had.

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PERCHERON NORMAN STALLION.

LIVE STOCK DEPARTMENT.

TO

Every-day Cyclopedia of Useful Knowledge.

DIFFERENT BREEDS OF HORSES.

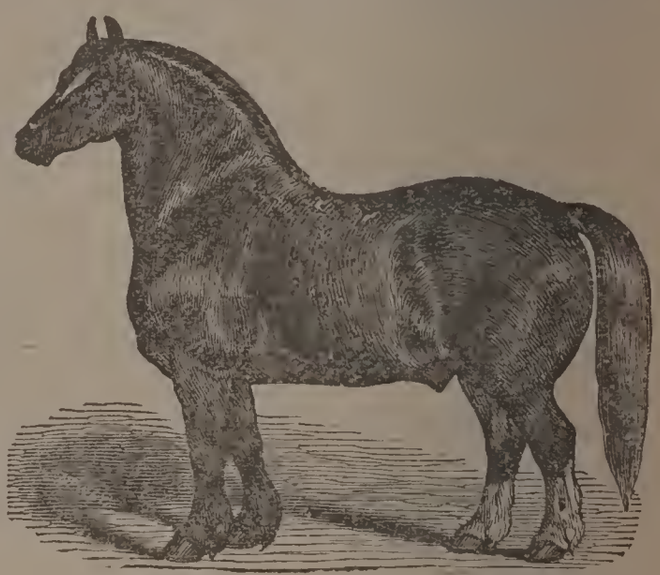
The first thing that will attract the attention of the average farmer in the equine department of an agricultural show will be the draught horses; and most numerous among these, especially in the Western States, will be the Percherons, or, as they are usually called in this country, the

PERCHERON NORMANS.—They are also frequently called Normans, or French horses, in the Western States. But by whatever name called, they are all practically the same, and are distinguished by their uniformity in color, being nearly always grey. Occasionally a black, roan, bay, or chestnut is seen; but fully ninety per cent. of them, both in this country and in France, whence they are imported, are grey. Those imported to this country will range in weight from 1400 to 1900 pounds. They usually have good heads, rather short necks, with rumps rather short and often a trifle drooping. The breed originated in La Perche, an ancient province of France, and importations from that country to the United States have been very large since 1852. Many mares have been imported, and a stud book is published in which the imported as well as the native purely-bred animals are recorded. A few stallions have been imported from Northern France and from Belgium—some of them greys, but usually bays—that are larger and coarser than the Percherons.

ENGLISH CART, OR SHIRE HORSES.—These are now the largest draught horses known, and with these the Clydesdales have been so extensively crossed that it is often difficult to tell just where the Clydesdale leaves off and the Cart, or Shire horse begins. It is, as the name indicates, an English breed, and the stallions frequently reach enormous weights—

considerably over a ton. In color they are more often black than otherwise, although bays and browns are occasionally seen. They have not been so largely introduced into this country as the two other draught breeds mentioned, the impression having prevailed that so very large and clumsy a horse was not suited to our wants.

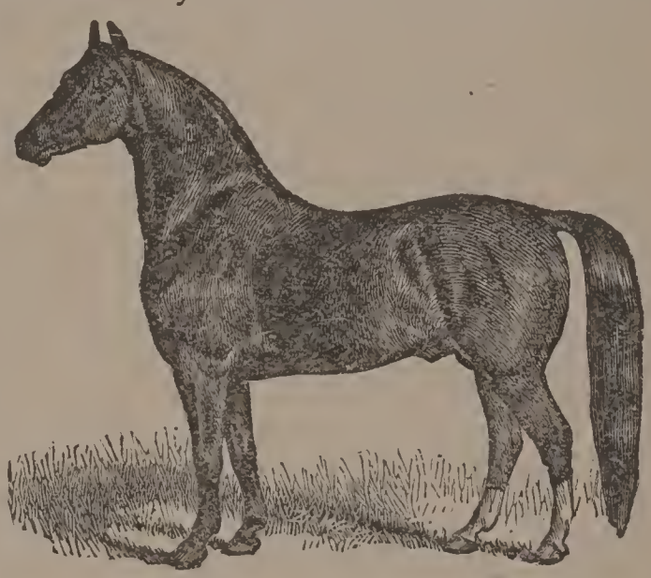
THE CLYDESDALES.—This is a breed that originated in Scotland, and is highly prized by many Americans. They rank next in importance, in point of numbers in this country, to the Percheron-Normans. In color they are mostly bay, but there are occasional blacks, browns, sorrels, and greys among them; and no matter what the color of their body may be, they nearly all have strong markings of white in the face and on the feet. White spots about the belly are also often found. In point of size, those imported to this country will average somewhat larger than the Percheron-Normans. They are also usually longer in the body and in the hind-quarters than the French draught horses. An abundance of long hair on the legs is considered a good point in a well-bred Clydesdale. These horses are now bred in considerable numbers in this country.



THE THOROUGHBRED.—You will often hear people talk about thoroughbred Morgans, thoroughbred Hambletonians, thoroughbred trotters, etc., but such talk only indicates a lack of information concerning the breeds of horses. There is but one breed of horses designated as thoroughbreds by horsemen, and this is a breed that originated in England, derived from a Turkish, Barb, and Arabian ancestry. It is the oldest and purest breed of horses in existence; is noted for speed, stoutness, endurance, energy, and resolution. For nearly a hundred years past their genealogy has been carefully recorded in a stud book, and the records of their performances upon the race-course have formed an important part in the sporting literature of Europe and America. They were introduced into this country at a very early day, and those bred here are certainly the equals of the very best produced in England. In fact, so frequent have been the importations of the choicest animals from England to America, that the blood of the two countries is identical. All running horses are of this breed, and none but thoroughbreds can make a creditable showing in long-distance or heat races. A horse with a dash

of this blood may make a fast race for a short distance, but it takes the genuine stuff to go a mile and repeat, in good time. They are of all colors, bay, brown, and chestnut predominating; are rather light of bone, and long in the body, with thin neck, small head, wide between the eyes, finely-pointed ears, long quarters, and deep chest, and are usually rather "leggy." In height they are from fifteen to sixteen and one-half hands, although they may sometimes be found a half a hand above or below these figures. They are nervous, restless, determined, and excitable, and are highly valued for crossing upon all other breeds.

TROTTERS AND ROADSTERS.—We have as yet no distinctive breeds of driving horses, or roadsters. The horses used for light driving, fast trotting, etc., are largely a conglomeration of all breeds and types. Some approximate the French Canadian pony in form and action, while others possess most of the characteristics of the thoroughbred; but so popular has fast trotting become in this country, and so universal is the fancy for fast driving horses, that at almost all our fairs the roadster class will be found more largely represented than any other, and usually more largely than all others combined. Indeed, the roadster is more distinctly an American feature than any other in our equine product; and we are fast approaching the time when the American trotting horse will be classed as a distinct breed. It is the creation of an American fancy—the result of a fashion that has demanded the fastest and stoutest trotting horses in the world for driving on the road, and to this end we have selected and bred until our horses surpass all others in this particular. Among these horses we have several recognized families of especial prominence, all more or less related, but each possessing features that are to some extent peculiarly its own, but none of them entitled to be called a breed.



Of these we may mention the *Hambletonians*, descended on the paternal side from imported Messenger (a thoroughbred) through his son Mambrino (also a thoroughbred), and Mambrino's son Abdallah, out of a mare of unknown blood, who in turn got Rysdyk's Hambletonian, out of a mare by Bellfounder (an imported Norfolk trotter), and her dam probably having two direct crosses to imp. Messenger. Through Rysdyk's Hambletonian on the paternal side, we have the Volunteers,

the Edward Everetts, the Alexander's Abdallahs, the Almonts, the Messenger Durocs, the Sentinels, the Happy Mediums, and all the various so-called Hambletonians of the present day. This celebrated horse was bred in Orange County, New York, foaled 1849, and was kept in that county until his death, which occurred March 26, 1876.

Then we have the *Mambrinos*, that take their name from Mambrino Chief, a grandson of the Mambrino above referred to, as the grandsire of Ryskyk's Hambletonian. The dam of Mambrino Chief, like the dam of Abdallah, was a mare of unknown blood. He was bred in Orange County, New York, foaled 1844, and, when ten years old, was taken to Kentucky, where he died, in 1861. Upon the highly-bred mares of that region he was very successful as a sire of fast trotters, and the mares got by him have been especially noted as producers of fast trotters when coupled with other trotting strains.

THE MORGANS are perhaps our oldest trotting family; and if they have not produced our very fastest trotters, their produce undoubtedly deserve

to take the very highest rank as good-tempered, hardy, and pleasant roadsters. They are descended, in the paternal line, from a horse called Justin Morgan, who was bred in Vermont, foaled 1793, and died 1821. His blood has never been positively known, although it is pretty well established that the thoroughbred predominated. From him we have the Morrills, the Fearnaughts, the Ethan Allens, the Black Hawks, the Daniel Lamberts, the Knoxes, and the Golddusts. The popularity of this family at one time was unbounded; and no blood, excepting that of the Thoroughbred, has been so generally disseminated and so highly esteemed throughout the United States. At present it is not so highly prized by those who place speed above all other qualities; but go where you will among livery-stable keepers or horse-railroad managers, and ask them what type of horses they have found most profitable to use and wear out on the road, and they will almost invariably answer, "The old-fashioned Morgan."

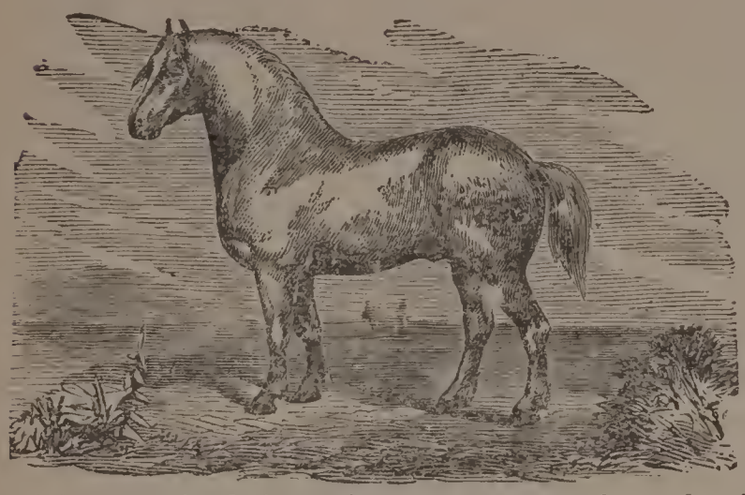
THE CLAYS constitute another trotting family of note. The original Henry Clay was a famous trotting stallion, foaled 1837, got by Andrew Jackson (also a famous trotter), who was a grandson of Bashaw (an imported Barb), and related to imp. Messenger through the second dam of his sire, who was by that horse. The dam of Henry Clay was a famous trotting mare, whose blood is unknown. From this horse we have the various families of Clays of the present day, and also the Patchens.

THE BASHAWS, another popular family of trotters, are very closely related to the Clays and Patchens, having a common ancestry in Young Bashaw, who was the sire of the Andrew Jackson above referred to. Young Bashaw was by the imported Bashaw, his dam was by a thoroughbred sire, and his grandam was by imp. Messenger. The most celebrated of the Bashaw family proper come through Long Island Black Hawk, who was by Andrew Jackson, out of a mare by Mambrino, son of Messenger. Through him we have Green's Bashaw (so well known in the West), the Mohawks, and many others of note.

THE PILOTS.—The blood of the old black pacer Pilot, who was probably of French Canadian ancestry, appears also to have mingled kindly with our best trotting strains, and many of our very best and fastest trotters have a dash of his blood, mainly through his son Pilot Jr. (a horse bred by the late R. A. Alexander, of Kentucky), out of a mare that was nearly thoroughbred. Old Copperbottom, also a Canadian pacer; Hiatoga, a horse bred in Virginia; Columbus, and Royal George, both from Canada, have all been very popular sires, and no compendium

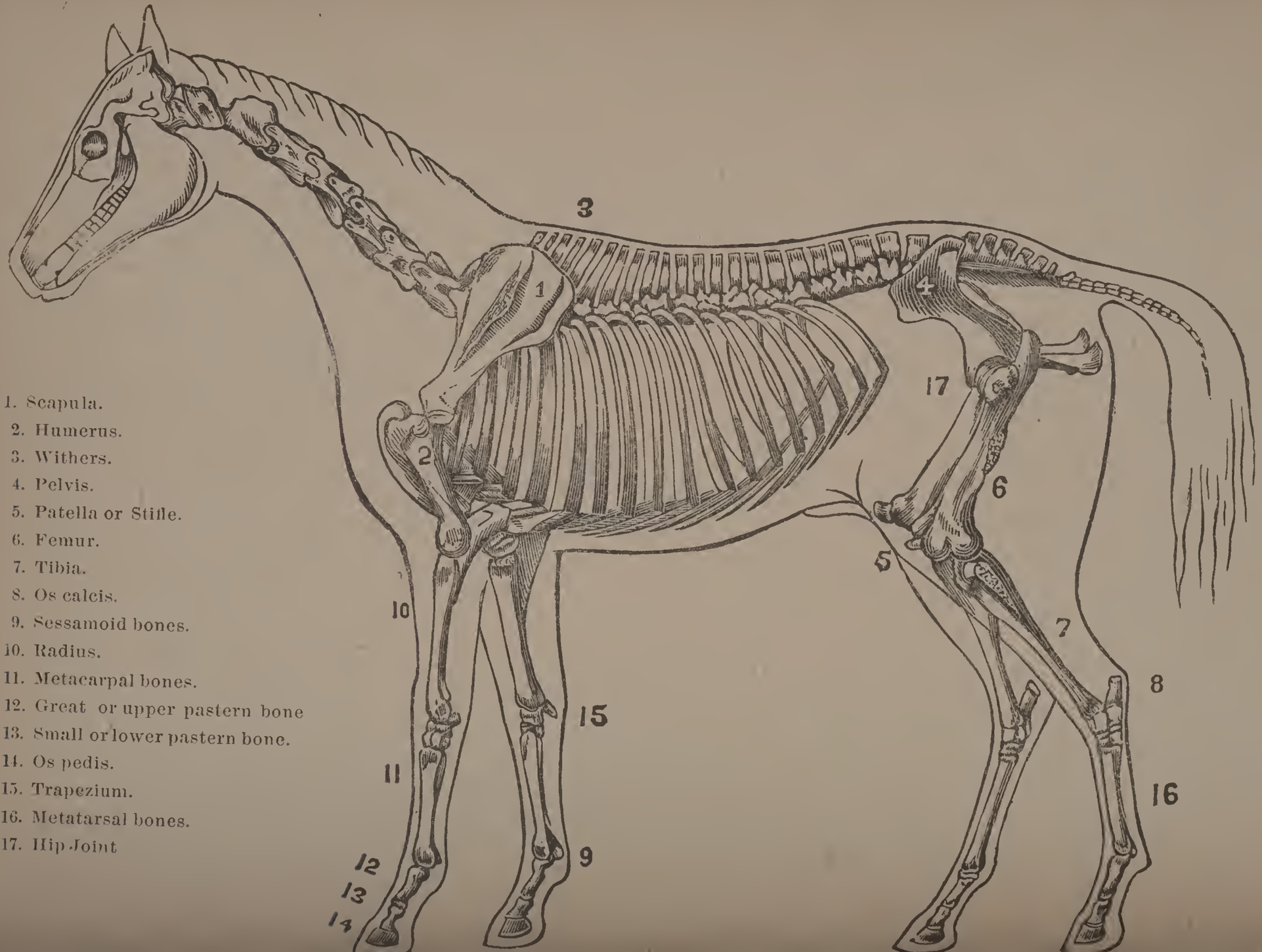
of the origin of the American trotting horse would be complete without reference to them.

THE "ALL-WORK" CLASS.—This will be made up of the odds and ends of everything in the shape of a horse; and here will be found representatives of all the breeds and families above described, crossed, mixed, and graded in every conceivable degree. Here a man will show a pony of fourteen hands, weighing 800 or 900 pounds; there will be another, with a typical American trotter; close beside him may be found some of the smaller Percherons and Clydesdales, while further on is a thoroughbred. The range in height will be from $14\frac{1}{2}$ to $17\frac{1}{2}$ hands, and in weight from 800 to 1700 pounds, all shown as "horses of all work," and each, in the eye of its owner, entitled to the highest award. From judging in such a ring, all intelligent horsemen desire to be excused, because there can be no horse best for everything. The term "all work" implies the saddle, the light road wagon, the plow, the street-car, the omnibus, the carriage, and the dray; and no one horse can be fitted for all these uses. If we were to modify the term so as to confine it to the *work of the farm*, then the range of uses would be greatly circumscribed, and a horse might be found that could draw the family carriage, the plow, and the farm wagon moderately well; but, in its usual unlimited sense, the "horse of all work" is a myth, and no such classification should be recognized.



CONFORMATION.—While with some men a knowledge of the shape of the horse appears to be almost intuitive, with others, and by far the greater majority, it is not so. Many acquire it by continued experience of losses and disappointments. Even those who are naturally pretty good judges of horse-flesh may peruse the following pages with advantage to themselves.

The "points" of a horse are represented in the opposite plate by figures. They vary more or less in different breeds. The racer, the hunter, the hackney, the draught horse, etc., each has some particular points in his best conformation that would be faulty in another class. For instance, in the draught horse we look for circularity of the ribs, breadth of chest, and fore-legs wide apart—points which would be



1. Scapula.
2. Humerus.
3. Withers.
4. Pelvis.
5. Patella or Stifle.
6. Femur.
7. Tibia.
8. Os calcis.
9. Sessamoid bones.
10. Radius.
11. Metacarpal bones.
12. Great or upper pastern bone
13. Small or lower pastern bone.
14. Os pedis.
15. Trapezium.
16. Metatarsal bones.
17. Hip Joint

SKELETON OF THE HORSE, AS DRAWN BY PROF. VARNELL.

ruinous in a racer, whose special vocation requires a deep chest and legs close together.

THE FRAME.—In a well-bred horse, the tendons, ligaments, and muscles are generally in keeping with the bones—*i.e.*, large bones usually give attachment to large, powerful muscles, tendons, etc. In the under-bred horse, however, we frequently find large, *coarse* bones, accompanied by small tendons and ligaments, and deficient muscular development.

The power and value of a horse increases with his size, provided the relative proportion of the parts and the general compactness is maintained. This, however, is rarely the case. *Very* large horses are seldom good for much. There is a certain size beyond which the parts do not seem to grow in due proportion to each other. Again, size and development must not be made up of, or largely interspersed with fat, but it must arise from natural development of bone, muscle, and tendon.

THE HEAD.—This should be small; wide across the forehead, lean, unencumbered with flesh, finely chiselled, terminating rather wide at the nostrils.

THE FOREHEAD.—Whilst the head should be small, the forehead should be *very broad,* in order to give due capacity to the cavity of the brain and great nervous centres. Energy and resolution largely depend on the development of the nervous system. Pluck and endurance will assuredly be wanting if the nervous power is deficient.

THE MUZZLE. — Breeding, or its absence, is very plainly indicated in the muzzle. In the well-bred horse every part is boldly marked. The borders of the nostrils are scanty and end abruptly. The nostrils themselves should be large and wide, and unencumbered with hair in the entrances, and they should occupy the whole of the lower part of the facial structure. The horse breathes entirely through his nostrils; hence the importance of large, well-developed nostrils.

THE MOUTH.—In the well-bred horse this is small, and the lips are small and thin, yet firm.

THE EYE.—This should be large, prominent, and mild, with a well-developed brow and fine eyelids. There is much to be gathered from the expression of the eye in regard to the character of the horse. The sunken, or "pig" eye is allied to vice, while the mild expression generally indicates good temper.

THE EARS.—These should be thin, delicate, small, and pointed forwards. The tips should be nearer each other than the roots. When the horse is at work, the ears should be kept firm. If they hang loosely,

it indicates want of tone and of muscular development. Large, flabby ears indicate an under-bred horse.

THE MANE.—In the well-bred horse this is fine, silky, and generally rather scanty.

THE NECK.—This should be light, long, and tapering toward its upper end. It should be "long in the rein," *i.e.*, longer at its upper than at its under side. The upper line of the neck from the withers to the head should form an elegant curve, while its lower surface should be gracefully incurvated as it approaches the jowl.

The throttle or commencement of the larnyx should stand out boldly, and the lower branches of the jaw-bone, adjoining the neck, should be wide apart, so as to give ample room for the respiratory passages. The crest should feel firm under the hand.

THE WITHERS are formed by the spinous processes of the anterior dorsal vertebræ. To these processes are attached many of the muscles, ligaments, and tendons which control the motion of the fore-hand. Well-developed withers are needed to give due length to the shoulders. Horses with somewhat high withers are generally pleasant and safe to ride.

It may perhaps be necessary to remind the reader that the withers are not the shoulder. The withers may be high and fine at the same time that the shoulder is narrow and badly formed.

THE SHOULDER.—The shoulder is usually spoken of as consisting of one bone. This is an error. It consists of two bones articulating together, viz., the scapula and the humerus. The scapula extends obliquely forward from a little below the withers to what is among horsemen termed the point of the shoulder; but this point is in reality formed by the articulation of the scapula with the humerus. The position of the scapula should be oblique, and the bone itself should be long. The humerus should be rather short. While the shoulder should be long, the length should be in the scapula or upper bone, and not in the humerus or lower bone.

THE CHEST should be deep, moderately broad and plump in front. The chest cannot well be too deep. Depth increases the capacity of the chest without producing any disadvantage, such as that occasioned by excessive breadth.

THE RADIUS, or upper bone of the leg, should be long in proportion to the length of the leg, or in other words, the greater the proportion of the leg above the knee, the better. This bone cannot be too thick and big, nor can it be too fully supplied with muscles. The ulna, or upper posterior portion of the radius, should be large, long, and prominent.

THE KNEE, in common with all joints, should be large and prominent, wide laterally, and although prominent should appear nearly flat when viewed from the front, and small when seen from behind.

THE METACARPALS, or bones between the knee and fetlock, are three in number:

The centre, or great metacarpal bone, otherwise called the cannon or shank, cannot be too short or strong. Shortness is a material item in its strength.

The small metacarpals, or splint bones, which lie on each side of the great bone, play only a subordinate part in sustaining the weight. Their chief use appears to be to give support to the outer bones of the knee.

THE FETLOCK, under which term we include the large pastern bone, or *os suffraginis*, and the small pastern bone, or *os coronæ*, should be of moderate length. The eminences and depressions of the head of the upper pastern bone should be well developed, so as to dip well into the corresponding parts of the lower, or coronet bone. This formation gives strength to the articulation, and eases the strain on the ligaments and tendons.

THE SESAMOID BONES are situated at the upper back part of the fetlock. Into them is inserted the superior sesamoideal, commonly called the suspensory ligament. It is important that these two bones should be large and well developed in order to give proper attachment to that important ligament.

THE COFFIN-BONE, or *ospedis*, or bone of the foot, does not often vary much in size in different horses. The size of the foot does not depend so much on the size of the bone, as on the quality and condition of the crust or horn which encloses the bone. The coffin-bone rests on innumerable springs. Concussion is thereby so expended as to be greatly lessened in the frame above. In the disease known as "Founder," the attachment of the *laminæ* to this bone becomes loosened and the toe of the bone then comes on the sole, and the peculiar condition recognised as "pumice" foot is produced.

THE NAVICULAR BONE is a small one placed at the inferior and posterior part of the coffin bone. It is frequently the seat of disease,—especially of caries.

THE FEET should be of medium size, regard being had, of course, to the build of the horse. The slope of the crust should form an angle of about 45 degrees with the ground. The hind feet are generally more upright than the forefeet. The horn should be tough and sound. A ringy condition of horn is objectionable. If the horn shows signs of

much chipping or breaking away at the nail holes, it indicates undue brittleness. White feet are more subject to disease than dark-colored feet. The sole should be moderately concaved. The frog should be moderately large, bold, and clean. The frog is an elastic cushion placed at the back of the foot to lessen the concussion in the horse's frame, and also to act as a stay against slipping.

THE LEG, below the knee, should be flat and broad. The tendons should stand out from the bone, and have a hard tense feeling.

The leg from the knee to the posterior should be straight. Prominence of the *trapezium* or bone at the back of the knee is a most important point. If this be small, the ligaments will be small, and the *leg will be small immediately below the knee.* No horse can stand hard work with so defective a formation.

THE BACK should be straight, and not over-long. It is strongest when straight and short, and weakest when long and hollow. A certain amount of length in the back is essential to speed.

THE RIBS should be deep and oval, especially behind the saddle; they should be continued well back towards the *pelvis.* If there is an undue interval; that is, an interval exceeding a hand's breadth between the last rib and the *pelvis*, the horse will be certain to run up light if subjected to work. A similar incapacity to stand work will be found in horses whose posterior ribs are wanting in due length. In the former case, the animal is said to be *slack*, and in the latter case, *light* in the ribs.

Condition has a good deal to do with the appearance of the posterior ribs and "coupling up."

If a horse, when out of condition, appears somewhat light or loose in the ribs, the purchaser should look well to his width across the loins. If he has width there, any slight defect in the ribs will be of no consequence.

THE PELVIS should be broad, deep and oblique, and its spinous processes, called the hips, should be moderately wide. Breadth and depth are needed in order to give space for, and attachment to, the muscles of the hindquarters. All propelling power in the horse is derived from these muscles. They should, therefore, be large and well developed; and it is essential to appearance that they should be laid on smoothly and evenly.

Obliquity in the *pelvis* is needed in order to give due length to the quarters.

THE LOINS should be large, long, well arched, and fully furnished with muscle. The thighs should be deep and full. There should, however, be sufficient interval between them to prevent friction.

THE HINDQUARTERS, taken as a whole, should be long, deep, full, rounded externally, and placed well under the centre of gravity.

THE FEMUR, TIBIA, AND STIFLE.—The first two jointly form the upper part of the hindquarters. The *femur* should lie obliquely forward, in order to bring the hind leg well under the horse.

The *tibia*, on the other hand, should lie obliquely back, so as to bring the hocks under the direct line of the incidences of weight. The muscles of the *femur* and *tibia* should be very well developed.

The *stifle*, or *patella*, should appear prominent and well defined.

THE HOCK should be clean, rigid, and well defined. Puffiness or swelling in any part is a sign of weakness or disease. The bones should be large and prominent. The hock as seen laterally should be wide, both above and below. Strength and size of bone and ligaments are both indicated by lateral width.

THE OS CALCIS, or prominent bone at the posterior point of the hock, should be very well developed, very prominent, and isolated, as it were, from the substance of the thigh.

THE TAIL in the well-breed is distinguished by the fineness and straightness of the hair. It should be carried firm, and well away from the hindquarters.

THE SHEATH ought to be large and well developed.

THE DOCK should be large and muscular.

THE BODY should be long and low; that is, it should stand over a good deal of ground, and yet be deep and broad in all parts. Such conformation is calculated to give speed and endurance.

THE MUSCLES throughout require to be well developed. Those of the arm, thigh, and back are of especial importance. A full, round, hard, firm appearance of the muscles of the thigh is an indication of strength in those parts. The muscles of the back should completely fill up the space between the ribs and the upper portion of the spinous processes of the back bone. Any deficiency, or hollow in the muscles on the sides of that bone, is an indication of weakness.

TENDONS AND LIGAMENTS.—The tendons which are most frequently sprained are those of the legs. They should be hard, clean, free from any gumminess, broad and flat. All the other many ligaments, which keep in apposition the bones of the various joints, likewise need to be strong and well developed. Outwardly their conformation is not actually visible.

In examining the tendons, do not trust the eye alone, but examine by pressure, using the fore-finger and thumb along their course, viz., the more flattened perforatus, which is situated posteriorly, the corded per-

forans immediately in front of it, and the suspensory ligaments in front of the last mentioned. After examining the leg with the weight on it, it should be lifted up, and the tendons and ligaments (being then relaxed) should be again examined and compared with those of the other leg. The inside of the knee should also be noticed, to see if there is any mark of speedy-cut.

We shall conclude these remarks upon conformation, by observing that neither frame nor constitution are of much use without good condition. The latter great essential can only be obtained by good grooming, careful and regular feeding on the best forage, strong, regular exercise, fresh wholesome air in the barn, and general good management.

AGE BY THE TEETH.—The principal guide to the age of the horse consists in the indications given by the teeth. We shall proceed in a brief manner to explain the changes which take place:

Structural alterations take place in the teeth every year, from birth up to the sixth year. Hence there can rarely be any question as to the real age of a horse up to that date, though dealers often try to deceive the unwary by various tricks, which are easily detected. After the sixth year, the age can only be *approximately* determined.

The horse possesses forty teeth, viz., twelve incisors, four tusks, and twenty-four molars, or grinders.

The incisors, or nippers, are situated in the front of the mouth, six in the upper and six in the lower jaw. Of the tusks, the two placed in the lower jaw are the most forward. These teeth, sometimes termed canines, or *cuspidati* (from *cuspis*, a point), are isolated, appearing in the space which divides the incisors from the molars. They are only fully developed in the male, the mare often being without them.

Three substances enter into the composition of the horse's tooth, viz., *crusta petrosa*, or hard crust, enamel, and ivory.

The *crusta petrosa* is the most externally situated, and when the tooth first appears in the mouth, it is entirely coated by this substance, having a dull and dark appearance. It fills up the *infundibula* of the upper jaw, and lines those of the incisors.

The enamel is a whitish semi-transparent shining crust, lying immediately under the *crusta petrosa*, and extending nearly to the root.

The ivory forms the main bulk of the tooth.

The foal is born usually with two, sometimes with three, temporary molars in each jaw. About 12 months old, another molar, a permanent tooth, appears, and before the completion of the second year a fifth molar, also a permanent tooth, shows itself.

About two and a half years old, the two anterior temporary molars

are replaced by permanent teeth; and between three and four, the remaining, or third temporary molar, is similarly replaced; and about the same time, the last or sixth permanent molar begins to appear. Thus when the mouth is completed, there are six permanent molars in each jaw, or twenty-four in all.

These structural changes afford a very good index of the age of the horse up to the period when they are completed, namely, four years old. After four years old, the molars are not often taken in consideration in determining the age of the horse.

We may mention, in passing, that a supplementary molar, known as a "wolf's tooth," sometimes appear in either jaw. Such teeth seldom cause any inconvenience. If they do so, they can easily be removed by the pincers, as they are only of a rudimentary character.

The anterior teeth, or incisors, are six in number in each jaw, when the mouth is complete; and in the immediate rear of these, in males, there is usually added one very peculiar pointed tooth on each side in each jaw, called a tusk. Though there are two crops of incisors, yet there is but one of tusks. In fact, these teeth, though they begin to appear about four years old, are not usually developed until the last permanent incisor is more or less up.

For the sake of brevity we shall confine our remarks to the lower jaw, as the structural changes which take place in the upper are nearly similar. In passing, however, we may remark that the upper incisors are considerably longer and larger than the lower.

Temporary, otherwise called milk, are easily distinguished from permanent incisors by the following well-marked signs, namely: they are smaller, whiter, and have more distinct necks. They are smooth externally, and grooved on the inside,—probably in order to enable the foal more easily to grip the teats of the dam. Their fangs are small, and have but little attachment to the gums. The jaws are plump, fleshy, and round, and the teeth are arranged in something like a semicircle.

Permanent teeth, on the other hand, are larger, broader, wider in their necks, grooved externally and smooth internally, and more discolored than milk teeth. The discoloration is due to the lodgment of the juices and other matters connected with the food in the grooves. The object of the external grooving probably is to enable the animal to get a better grip on grass and such-like food. The plumpness and circularity of the jaw is less than in the younger animal, and it gradually decreases, until in old age the teeth are arranged in a nearly straight line.

The foal is born with his teeth in a rudimentary state in the gums.

At various periods during the first ten months the different temporary incisors appear. Under one year old, the foal is also clearly distinguished by a woolly tail.

The yearling is complete in all six incisors, but several well-marked signs distinguish his mouth from that of the two-year old. The teeth at this period show but little signs of wear. The corner teeth are mere shells, having no inner walls. All the teeth are in close juxtaposition. At two years old, the inner wall of the corner teeth has grown up level with the outer wall. The centre teeth show considerable signs of wear, and, indeed, all the teeth appear somewhat smaller than they did in the yearling.

A few months before three years old, the horse sheds the two centre milk teeth, which are replaced by permanent. Thus the jaw at three years old contains two permanent teeth, and two milk teeth on each side.

A few months before four, the horse sheds the two next milk teeth, which are replaced by permanent. The jaw now contains four permanent and one milk tooth on each side.

A few months before five, the horse sheds the two remaining teeth, which are replaced by permanent.

The jaw is now furnished with six permanent incisors, but the corner teeth are mere shells, having no external wall. The absence of this wall distinguishes the five from the six year old.

A few months before six, the inner wall of the corner teeth has grown up level with the outer wall.

The mouth is now fully complete in incisors, and no further structural changes take place in them.

We now come to the *mark*, or *infundibulum*.—This is a very peculiar hollow extending, when the tooth first comes up, about half an inch down the temporary, and rather deeper down the permanent incisors.

Practically, teeth may be said to consist of two materials, viz., enamel and dentine. Enamel, which is very hard, sharp, and originally of pearly whiteness, covers the outside of the teeth, and also lines the sides and bottom of the hollow or *infundibulum*. Thus in the tooth there are four walls of enamel. The remainder of the tooth consists chiefly of dentine, a substance of considerable hardness, but less than enamel, and more like ivory.

When an incisor first comes up, the hollow affords lodgement for the *débris* of the food and the juices expressed from it, and therefore soon looks black. As the tooth wears down the hollow, of course, disappears; but the surface of the dentine immediately below the original hollow, being a somewhat soft material, has become stained for some distance

down. Thus there is still a black mark. With the further wear of the tooth the stained portion of the dentine wears away, and the "mark" is then said to be out. The mark, as the reader will easily see from this description is in a constantly changing condition.

We shall now endeavor to give some general rules for guidance:

Between three and five years old, the marks are very plain in the permanent incisors. At six, the marks are wearing out of the two centre teeth, which came up at three years old. They are plain in the two next, and perfectly fresh in the two corner teeth.

At seven, the marks have disappeared from the centre teeth, are wearing out of the two next, and are distinct and plain only in the corner teeth.

At eight, the marks have disappeared from all but the corner teeth, in which they are becoming indistinct.

At nine, the marks are not usually found in any of the teeth.

For about two years after the mark has disappeared in each tooth, there may still be seen in the form of a star a trace of the enamel which lined the bottom of the original hollow, and which underlies it for some depth. This star, of course, decreases in size with the wear of the teeth. About twelve or thirteen, the last traces of the enamel have usually disappeared, even from the corner teeth, but it may remain some time longer.

Many casual circumstances, however, cause a certain degree of deviation from these general rules. The time which the mark takes to wear out will vary in different horses according to the hardness or otherwise of the teeth, and according to the nature of the food on which the animal is kept. In grass-fed horses the marks usually remain at least a year, and sometimes two years longer than in those fed on hard food. Again in parrot-mouthed horses, that is, where the upper overlaps the lower jaw, the marks may remain for many years.

On the other hand, some horses which have a trick of biting the manger, wear down their teeth very rapidly, and therefore lose their marks very early. Horses fed on salt marshes, where the sea sand is washed up among the grass, or on sandy plains or meadows, are affected by the increased friction on the teeth caused by the sand. Occasionally a projecting tooth in the upper jaw may cause unusual friction on the corresponding tooth of the lower jaw, and so may hasten obliteration of the mark.

Most of these and other causes of irregularity of wear, which might be mentioned, are at once apparent to a careful and accurate observer, and will scarcely prevent his forming a pretty correct opinion of the age.

The upper incisors, as previously stated, are considerably longer and larger than the lower, and the *infundibulum* is nearly twice as deep. The marks therefore remain longer than in the lower teeth. We mention this, in passing, lest the reader should be misled, if he should by chance refer to the indications given by the upper teeth to corroborate or correct any opinion as to age, about which he may be in doubt from the appearance of the lower jaw.

Occasionally the dentine on the side of the *infundibulum* may become stained and even black, and in such cases something like a double mark may be observed.

The mouth, taken as a whole, is broader at seven years old than at any other period. After this it gradually narrows with age. In this respect, the drawings given, are in some degree at fault, as the author found it impossible to get mouths of the required ages to form a perfect ideal series.

Marks on the incisors are occasionally simulated by means of caustic, or the hot iron, by unscrupulous dealers with the view of deceiving the unwary. The fraud is easily detected, because though easy to make the black marks on the crowns of the teeth, it is impossible to restore the wall of pearly enamel, which, as explained elsewhere, surrounds the natural mark, or *infundibulum*. (See Cut.) From eight years old and upwards, the best indications of the age are given by the gradual alterations which take place in the shape of the teeth from wear, and in the closing of the mouth.

Lateral breadth, etc.—The teeth originally are *broad laterally* at their upper surfaces, otherwise called their crowns or "table," and thin from front to rear. They narrow gradually toward their necks and fangs. Hence, as their upper surfaces wear off, the teeth become narrower year by year. In very old horses there is often a positive interval between the teeth, and they appear like sticks in the jaw

Triangularity.—A further very well marked indication of increasing age is given by increasing depth from front to rear in the upper surfaces, or crowns, of the teeth.

Further wear causes the crowns of the teeth to assume a triangular form.

The teeth, though they diminish in lateral breadth, increase in thickness from front to rear, all the way from crown to fang.

At nine, the two centre teeth which came up at three become somewhat triangular.

At ten, the next two teeth show similar signs.

At eleven, the corner teeth have become somewhat triangular. This

alteration continues until in very old horses the depth from front to rear exceeds the lateral width of the teeth.

Length.—Again, as age increases, the teeth, notwithstanding they really wear down, become apparently longer. This effect is due to the fleshy parts of the gums receding faster than the teeth wear down. In extreme age, however, when the gums have receded as far as they can, the effect of wear causes the teeth to become *visibly* as well as *really* shorter.

Slope.—An alteration also takes places in the position or "slope" of the teeth, as regards their closing. This is due to the effect of wear.

In youth the teeth meet directly, whilst in extreme age they can scarcely be said to meet at all. Then stumps project forward in two almost parallel lines.

At two years old the gums are full, fleshy, and prominent, and the teeth are nearly perpendicular.

Up to twelve years old, there can scarcely be much difficulty in forming a pretty correct judgment as to the age. After that time, it requires more time, practice, and opportunity than most people have at disposal to obtain the requisite knowledge.

Suffice it to say, that the gums continue year by year to recede, the teeth become *apparently* longer and longer, and *really* narrower, and consequently the intervals between them increase, and they project forward more and more in a straight line.

THE TUSKS usually begin to appear in a very slight degree about three and a half or four years old. Their sharp points then just pierce the gums, and continue to grow until fully developed—about five or five and a half years old. They do not meet like other teeth, and therefore do not suffer from wear from that cause. They suffer, however, from wear in mastication. They undergo greater changes than any other teeth, and so form a valuable guide to the age. The tusk is a very peculiar shaped, elongated tooth. Internally it consists of dentine, and is protected on the outside only by enamel. The enamel, however, overlaps the dentine, and hence arises the sharp edge or hook of the newly-developed tusk, which may be felt if the finger be brought round it from behind.

This sharpness gradually wears off. After seven it has disappeared, and in each succeeding year the tusk becomes not only rounder and blunter, but its upper portion wears off. It also appears yellow, on account of the dentine becoming exposed by reason of the enamel wearing off its exterior surface. The tusks, unlike other teeth, do not apparently increase in length with years, but become shorter and shorter. In fact the effect of wear is greater on them than on other teeth, and it

is also greater than the process of the receding of the gum. In very old horses the tusk is very little above the level of the gum. Mares sometimes have four small rudimentary tusks.

The alterations which gradually take place in the form of the tusks are shown in the engraving.

In judging of the age of the horse, by the teeth, every collateral circumstance requires to be taken into consideration,—such as the form of the mouth, the way in which the teeth meet and close on each other, the food on which the animal has been kept, any irregularity in the upper teeth which may cause increased or diminished wear on the lower teeth, and also the habits of the horse in the stable. The teeth of animals which bite at the rack or manger whilst being cleaned invariably present appearences of wear beyond their real age.

The body also presents many indications of the age, which may assist us in forming an accurate opinion, and sometimes may enable us to correct an erroneous impression produced by some abnormal appearance of the teeth. The young horse is fleshy about the gums and head, and the hollow over the eye is shallow. Year by year, as age increases, the gums lose their fleshiness, the head becomes more lean, and the hollow over the eye deepens. The shoulders lose much of their thickness, and become finer and assume an appearance of greater length. The hind-quarters, in like manner, lose some of their roundness, and the animal generally gains an appearance of more breeding than he had in his younger days. The back becomes more or less hollow, a result partly due to the effect of weight—especially in long-backed animals—and partly to loss of fleshiness in the muscles which run along the spine.

Again, as the horse becomes old, the fulness of the chin under the mouth disappears. The inferior margin of the branches of the bone of the lower jaw also become thin. Lastly, the general appearance of the aged horse is much influenced by the work he has done and the treatment he has received.

Age must not be judged by any one sign, but by a mean judiciously struck between all the signs, and by a careful consideration of all collateral circumstances. It never happens that all the signs combine together to deceive a careful and well-informed observer.

From these pages the reader will perceive that after six years old,—*i.e.*, after the structural changes in the mouth are completed,—it is impossible to lay down any one single definite rule by which the age can be ascertained. Still, with a little trouble and attention there is no real difficulty in acquiring a knowledge of the horse's age up to a comparatively late period of his life.

Such a knowledge is always valuable to an intending purchaser. Horses of eight or nine years old are still in the prime; but from want of knowledge of the means of ascertaining the real age, and from very natural distrust of what the owner may tell them, the public are very shy of buying such horses; and consequently they may generally be obtained at prices far below their real value.

The author is well aware of the popular feeling in favor of young horses; but, in his own opinion a moderately fresh aged horse is generally a much more useful, presently available, and therefore more really valuable animal than a young, untried horse with all troubles, ailments, diseases and liability to disease before him.

DISEASES OF THE HORSE.—Bots are the larvæ or grubs of the Œstrus or Gad-fly. The eggs are deposited on the legs, arms, knees or body of the horse during the autumn, and are licked off by the animal and hatched in the stomach, to the cuticular coat of which they cling by two strong hooks or *tenaculà*. Their heads, which are situated between these hooks, are buried in the lining of the stomach. They often adhere so tenaciously, that their bodies may be broken before they will quit their hold. They are sometimes found in the villous coat, and they but rarely extend into the *duodenum*. The mucus of the stomach seems to be their food.

About June or July the bots are often voided in the dung, and they then assume the chrysalis or grub form, and remain so for a few weeks, when the case opens, and the fly takes wing. Bots, when being voided, often adhere by their *tenacula* to the fundament. There are several species, but it is not necessary here to describe them.

Their presence does not seem usually to act injuriously on the health of the horse, though occasionally the stomach is eroded by them. When they are seen in the dung, they are usually undergoing the natural process of being voided before their transformation; and if we have patience, nature will quietly expel them without our aid. At this period a dose of physic may, perhaps, hasten the loosening of their hold; but we cannot make them quit their tenement much before nature disposes them to do so, inasmuch as their bodies are hard and insensible to the action of any medicine, and their heads are enveloped in the lining of the stomach.

Bronchitis consists in inflammation of the bronchial tubes. There are two forms of the disease, inflammation of the larger tubes, and inflammation of the smaller. Symptoms are hurried breathing, dilatation of the nostrils, heaving flanks and fever.

The horse should be warmly clothed, bandages applied to his legs,

and his food restricted to grass, carrots, or bran mashes. If the legs are unequal in warmth, and the coat is inclined to stare, give an ounce of nitric ether, and four ounces of acetate of ammonia, in eight ounces of water, both morning and evening, and a ball made of two drachms each, of resin, nitre, and antimony.

Inhalation of the steam arising from boiling water poured over the hay will be found to give much relief.

Bursal enlargements.—Thorough-pins, Bog Spavins, Windgalls, and all such like affections, in whatever part appearing, may all be conveniently classed under the common head of Bursal Enlargements.

Such enlargements, though proceeding from various causes, are in themselves simply distensions of the bursæ or sheaths, which inclose all true joints and certain parts of all tendons and of some ligaments. The enlargement in recent cases arises wholly from an increased secretion of synovia, otherwise called joint oil; but in cases of long standing it is often much increased by thickening of the synovial fringes, and sometimes also by the products of inflammatory action in the bursa.

Nature has endued these bursæ and sheaths with a lining membrane, which secretes synovia, a fluid resembling oil, for the due lubrication of the parts.

It is not necessary here to enter into the physical structure of synovial membranes. It may be sufficient to say, that the outer coat of the membrane is thick, tough, and but slightly sensitive; whilst its inner lining is highly vascular and sensitive. From this lining is secreted the clear bright glistening pale straw-colored sero-albuminous fluid, known as synovia, or joint oil.

When any cause, such as over-exertion, produces irritation in the part,—the synovial membrane is excited by the irritation to throw out an increased secretion of oil. This increased supply must not be regarded as an evil in itself. On the contrary, it is useful in lessening the irritation, and is, in fact, a bountiful provision of nature for that purpose. Similarly, when a sprain occurs in the ligaments of a joint, or in a tendon, an increased secretion of synovia is poured forth with the same object.

The liability to the occurrence of such causes is of course greatly dependent on the conformation of the animal. Upright shoulders, fetlocks, or hocks, and all other points of conformation which do not give due elasticity to the frame in action, are also liable to cause bursal enlargements.

Chronic inflammation of the joints, which is often found as a result of

pneumonia, influenza, and sometimes of general debility, is another common cause.

Though over-work, sprain, faulty conformation, or chronic inflammation of the joints may be set down as the usual causes of bursal enlargements; yet they sometimes occur without any such violent exciting causes, and can then only be attributed either to a special irritability of the synovial membrane, on account of which it is excited to increased action on very slight provocation, or to weakness of the coats of the blood vessels of the membrane, through which an undue effusion takes place.

From these general remarks on the nature of synovial membranes, and on the causes of bursal enlargements, we pass to the consideration of the particular affections, which bear various names according to the part in which they appear.

Bog spavin is distension of the bursa of the true hock joint. This joint consists only in the articulation of the *tibia* and *astragalus*. The other bones of the hock do not enter into it. The swelling shows itself primarily in front, because in that part the capsule is large and loose, and not bound down by bones or ligaments, and therefore it is easily distended.

Bog spavin is most frequently found in upright shaped hocks, because that formation induces concussion and irritation. It is also commonly found in weak hocks of any description, because in them any over-exertion is likely to be injuriously felt, and therefore is very liable to cause irritation.

Thorough-pin is the name given to a bursal enlargement which occurs at the upper and back part of the hock beneath the great extensor pedis tendon. The swelling appears sometimes on one side only, but more frequently on both sides.

There are two kinds of thorough-pin, namely, those arising from irritation in the true hock joint, and those which are caused by irritation or sprains of the flexor pedis tendon.

Thorough-pin arising from irritation of the true hock joint is, in fact, only a further development of bog spavin. The increased secretion of synovia shows itself primarily in distention of the lower part of the burs'. When this portion is full, any further increase shows itself in the upper part. The swelling appears equally on both sides, and the fluid may by moderate pressure be forced from one side to the other. Hence is derived the name of Thorough-pin, or running "through" from side to side.

The other and more common description of thorough-pin is not con-

nected with the true hock joint, but arises from irritation of the flexor pedis tendon.

This tendon is tightly bound down at its upper part by the ligaments at the back of the *tibia*, and again below as soon as it reaches the inside of the hock. Hence any increased secretion of synovia can only lodge in the intervening space—*i.e.*, in the hollow of the hock, either on one or both sides.

If the seat of the injury be high up (and it generally does occur, as we might expect, near the bend), we find the enlargement on both sides; but that on the outside is generally larger than that on the inside. If, on the other hand, the seat of the injury is lower down, the swelling may, on account of the position of the part of the tendon injured, appear only on the inside; but it more often appears on both sides, or on the outer side only.

Thorough-pins arising from irritation of the flexor pedis tendon are at once distinguished from those described in the preceding paragraph, because there is no lower enlargement or bog spavin. It is, however, very possible that both kinds of thorough-pin and bog spavin also may be present in the same hock.

Bog spavins and thorough-pins vary very much in size, according to the nature and degree of the particular case. They may be so small as to be scarcely perceptible, or they may be of enormous size.

Windgalls are similiar enlargements arising from very similar causes in the neighborhood of the fetlock joints. They seldom, however, become of any great size. They more commonly arise from over-exertion and irritation of the parts than from actual sprain. Indeed, the fetlock joint is so constructed that it is very rarely sprained.

Similar enlargements, if any sufficient cause exists, sometimes appear in the neighborhood of other true joints. The hock, however, and fetlock are the common seat of bursal enlargements.

The utility, or otherwise, of treating a bursal enlargement depends mainly on the cause from which the swelling arises in the particular case.

Those which are due to the effect of work, concussion, and such like causes, though they may be temporarily got rid of by the means hereafter detailed, will generally reappear as soon as the horse is again subjected to the causes which originally induced them.

Those, however, which have arisen from the effect of accidental sprains of ligaments of joints, or of tendons, are not equally liable to reappear, if they can at once be reduced, because the causes are not equally likely to recur.

Rest in either case is the primary requisite. Rest will allay the irrita-

tion in the part affected; and with the cessation of the inflammatory action which produced it, the increased secretion will soon cease. Friction and pressure, by rousing the action of the blood vessels and absorbents of the part, will also assist nature to take up the extra secretion.

A sweating bandage, that is a wet bandage covered with oiled skin, and this again covered with an ordinary flannel bandage, has often a great effect in reducing the enlargement. In the hock, and in some other parts, which cannot be conveniently bandaged, pressure may sometimes be successfully applied by means of a carefully adjusted elastic steel truss. This will also answer well for thorough-pin. In cases, however, of bog spavin, an India rubber bandage with a hole in it, through which the point of the hock may pass or project, will be most convenient.

Medicine, either laxative or diuretic, is also useful in drawing off the superfluous secretions of the system.

If these measures fail, a blister or succession of blisters may be tried; but as a general rule, no *permanent* benefit results from such practice. If the case is of recent origin, the milder measures recommended above will probably remove, temporarily at least, the enlargement; whilst if it is chronic, even severe measures will fail to affect it.

As a general rule, it is best not to apply treatment to bursal enlargements. They seldom produce lameness; and when they do, or at least are supposed to do so, the cause of the lameness will generally be found to be sprain of the ligaments or tendons, or of their sheaths, of which the external enlargement is only a result. In some cases, however, the enlargement becomes of so great a size as to be a serious eye-sore, or even to incapacitate the horse from fast work.

Occasionally, in recent cases arising from severe sprain, we find the bursa or sheath evidently full of synovia, whilst its walls from distention have become very thin. This is especially apt to be the case in the hock. Such cases must be treated as sprains. Rest and cold applications will be needed until the inflammation is reduced. A blister may then be applied; and should this not have the desired effect, continued pressure by means of an elastic truss may be tried.

In rare cases the swelling remains as large as ever, long after all the inflammation has apparently subsided, and notwithstanding the treatment recommended above. If the horse is valuable, it is worth while to try the effect of time and gentle exercise, such as the animal will give himself in a shed with a little yard attached. Nature under such favorable circumstances may bring about a cure.

It has often been recommended in such cases to puncture the sheath or bursa, and so allow the synovia to escape. There is, however, great danger of violent inflammation setting in on account of the admission of air to the interior of the bursa. If it is decided to try the experiment, the puncture should be made at the lowest convenient part of the swelling; because the synovia, which will continue to ooze out, will help to exclude the air until the ordinary processes of healing has completely closed the orifice. Even, however, if the operation is so far successful as to be unattended with any injurious consequences, the probability is that the enlargement will soon reappear.

Some veterinarians have recommended that a strong astringent should be injected into the bursa or sheath with a view of causing such an amount of inflammation in the part as may probably lead to thickening and contraction of the coat of the synovial membrane, and thus prevent renewed distention. Such treatment, however, is very dangerous, and much more likely to produce a disastrous result than to do any good.

Blood spavin, though not a bursal enlargement, is yet connected with it; and may, therefore, perhaps be conveniently mentioned in this place. In some cases, when a bog-spavin is large, its protuberance impedes the flow of the blood through the vein, which passes over it; and in consequence dilatation of its coats takes place just under the seat of the bog spavin. There is no direct remedy, but any treatment which lessens the bog spavin will decrease the tendency to retardation in the upward flow of the blood. No great harm results from the dilatation of the vein. The greater part of the swelling is always due to the bursal enlargement, not to the vein.

Capped hock may be simply a serous effusion under the skin at the point of the hock; or the above may be accompanied by thickening of the integuments and inflammation of the bursa, and by deposit of coagulable lymph.

The injury is usually caused by kicking in the stable or in harness. Some horses, however, contrive to injure themselves in the act of lying down or getting up.

In rare cases the enlargement may arise from rupture of the lateral attachment of the perforatus tendon at the apex of the *os calcis*. This injury will be recognized by a flattened appearance of the point of the hock when the limb is in a state of rest,—which, however, disapears when the hock is flexed.

Capped hock generally produces no serious effect; but it is unsightly and difficult to get rid of, both because the causes which produce it are apt to recur, and also because active treatment, such as blistering, cre-

ates an amount of irritation which increases the tendency to kick. Treatment by pressure, which would be very beneficial, is difficult to apply to the part.

If the enlargement consists of a simple subcutaneous effusion, it may be treated by a puncture. But if the swelling is in the bursa, it is dangerous to open it. In such case, fomentations may be applied with a view of reducing the inflammation, and afterwards hand-rubbing may be employed in order to promote the action of the absorbents of the part and stimulate them to remove the increased and superfluous fluid. Very generally, however, the swelling becomes chronic.

In lieu of cantharides, which is often employed with good effect to remove similar swellings in other parts, biniodide of mercury or tincture of iodine, which, when lightly rubbed on, does not occasion any great irritation, may be tried; but it must be resorted to before the swelling has become chronic.

Cases of rupture of the lateral attachments of the perforatus tendon at the apex of the hock must be treated as recommended for sprains.

In very rare cases the horse, by violent kicking, may injure the point of the bone, and caries may supervene, which will render the animal useless.

Capped elbow is similar to capped hock, and should be treated in the same way.

Catarrh, or common cold, is an acute inflammation of the mucous membrane which lines the nostrils. It is attended by a sero-mucous discharge from the nostrils, increased redness of the schneiderian membrane, oozing of tears from the corners of the eyes, occasionally by swelling under the jaws, and a snorting cough.

Catarrh in adult horses usually arises from some neglect or other in the management of the animal or of the stables. With young horses first brought into stables, catarrh is of very frequent occurrence. It is also occasionally found as a consequence of or accompanying laryngitis, or sore throat, because the inflammation set up in that disease very readily extends to the similar continuous membrane of the nostrils.

The premonitory symptoms are loss of appetite, dullness of the eye, staring of the coat, a tendency to sweat upon slight exertion, and a little watery discharge from the nostrils, followed by slight feverishness, slightly quickened pulse, and somewhat hurried breathing, and a hot mouth. The bowels are usually constipated. In most cases the throat is more or less sore.

In the early stage of the feverish symptoms, the natural secretions of the part are, as is usual in inflammatory attacks, temporarily arrested;

but in the second, or moist stage, there is an increased discharge from the nostrils.

If the disease runs on, the glands under the jaw become inflamed and swollen from sympathy with the inflammation existing in their neighborhood. If the throat become positively sore, laryngitis may be said to have supervened.

The treatment required in the first instance is simply removal to a cool, loose box, with abundance of fresh air, extra warm clothing, flannel bandages to the legs, deprivation of corn, warm mashes, and laxative diet. With proper care, no case of incipient catarrh ought ever to be allowed to develop itself into any serious mischief. A very few days will, in general, see the patient restored to health.

If, however, the running at the nose is considerable and the cough troublesome, it will be advisable to steam the head frequently during the day; and if the patient becomes feverish, a dose consisting of half an ounce of sweet spirits of nitre and two drachms of nitrate of potash may be given once or twice a day for two or three days. If the bowels are constipated, intsead of the previous medicine, a dose consisting of two ounces of Epsom salts with half an ounce of nitrate of potash may be given twice a day until the desired effect is produced.

Canker in the foot.—Where thrush is neglected the disease often turns to canker. It extends from the horny frog to the sensitive and to the sole of the foot, and frequently to the navicular joint. Thrush always precedes canker. It is detected in the early stage by a fungoid growth of the frog, which bleeds upon the slightest exciting cause. The treatment consists in removing with a sharp knife all loose horn, trim off a portion of the fungoid tissue, and wash once a day with the following: An ounce of nitrate of silver well shaken in a quart of rain-water. Good care and nutritious food will do much towards bringing about a successful cure.

Chronic foot lameness.—As a general rule a diseased foot is, for obvious reasons, hotter than a sound one; but in some cases of continued lameness, and especially in navicular disease, the affected foot may be colder than the other. This peculiarity may be caused partly by the foot having been for a length of time saved or "favored" by the animal; and partly, sometimes, by the measures taken to reduce the inflammation existing in it.

In cases of long-continued disease or disuse, the size and form of the foot is always affected. Any such structural alterations should place the buyer upon his guard.

Contraction of the foot.—Contraction is not, as was formerly

supposed, a disease in itself, but merely a result of disease or of disuse. This latter cause may, however, arise from circumstances—such as sprains of the tendons of the legs—which are not connected with any disease in the foot itself.

Although not primarily a disease, contraction may, under certain circumstances, become a diseased condition which will assist in causing lameness.

Feet are not necessarily contracted because they are small. Small feet are often a natural formation, especially in high-bred horses. If the fore feet are small, reference should be made to the hind feet. If the latter are likewise small, we may regard the formation as natural. The objection or otherwise to small feet depends very much on the general conformation of the animal. In a light, well-bred horse small feet are very much in accordance with the other features of his frame; whilst, on the other hand, they would be incompatible with, and probably quite insufficient to sustain a large, heavy carcase. Brittle feet are very objectionable. The horn should be tough and sound.

Although, as a general rule, the fact of one foot being smaller than the other should be viewed with great suspicion (and a remark should always be made on it by the examiner to an intending purchaser), yet it by no means follows that the horse must necessarily go lame on it. The contraction may have arisen from disuse, caused, as mentioned above, by disease quite unconnected with the foot itself. Cases also frequently occur in which the small foot remains sound and serviceable for years, even although at some previous period it may have been diseased. We advise that in all serious or doubtful cases of lameness a veterinary surgeon be consulted.

Corns.—These make their appearance in the hoof in the angle formed by the crust and bar. It is usually the fault of the shoe. Cut the hoof about the corn, and trim the corn down close, and burn with lunar caustic or a hot iron. Remove the shoes, and put the horse to pasture.

Colic, sometimes called gripes, fret cramps, etc., is spasm of the muscular coat of any part of the intestines. The causes are various, among which may be mentioned crib-biting, worms, costiveness, hair-ball, and calcareous or other accretions arising from the use of hard or mineral waters. The early sign of colic is pain in the region of the intestines, as indicated by the horse looking anxiously round towards his flanks. As the pain increases, the animal will paw the ground, lie down and get up again, exhibiting every sign of distress. This soon passes away, but again returns. Rub the belly well. Friction will give relief by increasing the vermicular motion of the intestines, and by drawing the blood

from the interior to the surface. The legs should be wrapped in flannel bandages, and the body warmly clothed. An embrocation of turpentine may be also rubbed on the abdomen. Clysters of warm water mixed with a little oil or soap (in protracted cases add an ounce or two of spirits of turpentine) are very useful in causing evacuation. If relief is not obtained in twenty minutes, administer a stimulant. An ounce of nitric ether with four drachms of aloes in solution is good. If in half an hour the patient is no better, repeat the stimulant, and give a full dose of castor oil (eight or ten ounces). If the attack lasts over an hour and a half, hot fomentations, by means of a blanket steeped in hot water, must be applied to the belly. Perseverance in the above remedies will bring relief, and effect a cure.

Cracked heels, sometimes called sand crack, is found in hoofs that are hard and brittle. Naturally the hoof is elastic, and not easy to split. This fissure generally occurs in the "quarter." In treating this disease it is best to remove the shoes. After cleaning the foot carefully, apply a solution of chloride of zinc (six grains to a wineglass of water). Wash frequently with soap and water.

Curb may be a sprain of the ligament, which connects the *os calcis* with the *cuboid* and external *metatarsal* bones; or it may be sprain of the broad annular (*calcaneo metatarsal*) ligament, which passes over and binds down the tendons in their passage down the back of the hock.

Curb is easily recognized by a protuberance at the back of the hock about five inches below its upper point. The examiner should stand exactly at right angles to the line of the back of the leg, when any deviation from the perpendicular line cannot fail to be noticed. If he stands more anteriorly, he may mistake the prominence of one of the bones for curb; whilst if he stands more to the rear, he may fail to notice the deviation from the straight line.

Over-bent or "sickle-shaped" hocks, and small hocks, are peculiarly liable to curb.

The treatment is the same as that required for any other sprain. The lameness usually subsides, as soon as the inflammation is reduced. The strain of the ligament will be lessened by the application of a high-heeled shoe.

Fistulous withers are similar in their nature, and require much the same treatment as poll evil. They are nearly always caused by pressure from the saddle, or collar, or by injuries.

In most cases the mischief is at first very slight, and a day or two's abstinence from work, with a little alteration of the saddle or collar, will generally effect a cure and prevent recurrence. If the skin is tender, a salt and water dressing may be applied.

When, however, the cause is continued or repeated, the tissues under the skin become inflamed, and the cartilaginous pads of the heads of the spines of the vertebræ may be injured. If such should be the case, fomentations must be applied in the first instance to reduce the inflammation. If these fail, as they often do, in bringing about resolution, matter will probably form under the skin.

Unless a free opening is made for its escape, it will burrow in under and among the muscles, tendons, and ligamentous tissues, which lie on each side of the spine or withers, and will form sinuses. The treatment, in such cases, is exactly the same as that of poll evil. Nothing answers better than the seton.

Caries of the spinous processes of the bones of the vertebræ, occasionally supervenes. It will be indicated by the offensive smell proceeding from the sinuses. Unlike the similar occurence in poll evil, this further development is easily treated; and a radical cure, without any injurious result, may generally be effected by removing the injured portions of the bone by the pincers. The parts, as a general rule, heal over favorably, and nothing more than a slight hollow will be noticed about the withers.

FOUNDER, or LAMINITIS, is at once indicated by great heat in the part, by throbbing of the plantar arteries, and by almost absolute inability of the horse to move. The horse stands with his legs drawn up under the body, in order to take the weight off the fore feet. If the horse is well-conditioned, take a quart or two of blood from each fore foot, then administer a purging ball. Apply flaxseed poultices to the foot, and give an injection of warm soap-suds. If the disease is neglected until it becomes chronic, the animal will never fully recover.

GLANDERS.—The appearance of glanders is primarily indicated by swelling of the submaxillary gland. Fever is seldom present to any noticeable degree, except in the acute attack. After a time, a discharge of a gluey nature appears from the nose, usually from one nostril. The submaxillary gland on the same side, as the swelling first appeared, becomes more swollen and painful. The gland appears hard, and there is no disposition in the tumor to suppurate or to disappear. The lining membrane of the nose is heightened in color. A very marked symptom soon occurs in the formation of a hard lump in the centre of the gland under the jaw. The swelling is peculiarly distinguished by being hard, firmly adherent to the bone, and not painful on being touched. A diffused soft swelling of the glands is often found in diseases of the air passages, but this is quite different to the hard tumor of glanders. Again, in glanders, the absorbent vessels in the surrounding parts generally, after a time, become enlarged, hard, and corded.

The discharge from the nostrils is at first aqueous, then mixed with ropy mucus. It afterwards becomes glairy and gradually assumes a yellow appearance. From admixture of albumen with the mucus and the formation of pus-cells, it assumes a straw color, and in the very late stages it becomes of a more purulent character. The quantity and quality of the discharge, however, varies in different cases,—it may be slight or copious, it may be thick or thin,—but the one constant sign which induces us to suspect glanders, consists in the discharge being *glue-like and adhesive.* It clings about the hair round the nostrils, and may even clog the nostrils, and produce difficulty in breathing.

The duration of the gleet, before further symptoms are developed, is extremely variable. When the disease originates spontaneously, it may be only a few days, or it may be weeks or months, or longer, depending much on the condition and on the care taken of the animal, and on his constitution. But in those cases which are produced by inoculation, ulceration in the nostrils generally follows in from eight to fifteen days after the appearance of the nasal discharge. Until there is ulceration the discharge from the nostrils is not offensive; but when ulceration has taken place to any great extent, the running is very offensive on account of the sloughing of the tissues affected by that process.

As the disease progresses to its latter stages, the animal falls away in condition, and the hair of the mane and tail is easily pulled out. With increase of the disease, the weakness and emaciation increase. In the last stage there is generally a large development of farcy buds in various parts of the body. Before death the nostrils are much swollen from the intensity of the inflammation accompanying the ulceration, and this, together with thickening of the schneiderian membrane and the tenacious nature of the discharge, causes the patient to breathe with difficulty and to be almost suffocated. In some cases the bursting of abscesses in the lungs occasions death by suffocation. At other times, when glanders is combined with farcy, the animal dies a mass of disease.

This disease has, so far, proved incurable, and the description here given is with a view to distinguish it from other diseases with which it may be confounded. It is highly contagious to horse and man, and when a horse is known to have glanders, it should be destroyed.

INFLUENZA is a specific disease, characterized by febrile and catarrhal symptoms, accompanied by a loss of appetite, prostration of strength, and often complicated with disease of the liver, lungs, and mucous membrances generally, and sometimes with affection of the heart. Influenza

has its origin in some peculiar condition of the atmosphere, the exact nature of this condition is unknown. The symptoms are as follows: The horse appears dull, weak, and dispirited; refuses his food, his coat looks unhealthy, the eyes and nostrils appear red, and the pulse is quick.

The discharge of purulent matter from the nose in the early stage is a good sign, and indicates that the disease is becoming milder.

Good nursing is the first requisite. The medical treatment consists mainly in the absence of drastic purgatives and strong sedatives. Saline agents, however, such as sulphate of magnesia, in doses of from one and a half to two ounces for several days, or acetate of ammonia in doses of four ounces with an ounce of nitric ether once or twice a day, are good.

If there is much fever, a dose of from half to one drachm of tartarized antimony dissolved in water may be added to the above. Another remedy is the following: spirits of nitric ether, 1 ounce; laudanum, 4 drachms; nitrate of potash, 3 drachms; water, 1 pint. Mix and drench the animal twice a day. Great care should be exercised during convalescence. In severe cases, it is advisable to consult the veterinary surgeon.

Intestinal worms.—Three kinds of worms are commonly found in the horse, namely: First, the *ascaris lumbricoïdes*, or long round worm, which we frequently discover in the dung; they inhabit the small intestines, and are sometimes twelve inches long. Secondly, the *ascaris vermicularis*, a small needle-like, lively worm, found in great numbers in the large intestines and *rectum;* this worm is usually white in color, and about half an inch long. Thirdly, the *strongulus*, a slender worm measuring from two to four inches in length, and consisting of a rounded body for half its length, with a contracted thread-like head; these are found in the large intestines.

In some cases the presence of worms may be detected by their being excreted along with the dung; whilst in other cases their presence can only be suspected by a peculiar hard, dry unthrifty appearance of the coat; or at other times by frequent whisking of the tail and by some dry white matter adhering round the *anus*. Worms may also exist for a length of time without presenting any outward appearance, which might lead to their detection.

In some cases they injuriously affect the health of the horse, whilst in others they seem to do no harm.

A dose of two ounces of turpentine given in a pint of linseed oil will affect a temporary clearance. Or a drachm of tartarized antimony may be given for six consecutive mornings before the horse is fed, followed on the seventh day by a dose of physic. A drachm of calomel for two or

three consecutive nights, followed by a dose of physic, will also answer. The small worms, which inhabit the *rectum*, may sometimes be cleared away by injections of a weak solution of aloes.

Professor Varnell recommends, as the most effectual treatment, the administration daily, for ten days or a fortnight, of doses of two drachms of sulphate of iron, followed by a dose of physic.

Lameness.—*Temporary Causes.*—Lameness is often caused by pricking, or by tight nailing, or sometimes by a bruise of the sole. The seat of injury will be best detected by pinching the foot or tapping it with the hammer. A full examination with the drawing knife must be made of any part which may appear unduly sensitive under the application of the above tests.

Lampas, or Lampers, is a term used to designate an active inflammation or swelling of the "bars" or "ridges" in the roof of the mouth. It usually occurs in colts when shedding teeth.

Treatment.—Cut or scarify the parts affected with a lancet or sharp knife, and then bathe with alum water. In severe cases, burn with lunar caustic.

Laryngitis.—The seat of this disease is in the membrane covering the upper part of the larynx or box of the windpipe. When the pharynx or back part of the swallow is affected, the disease is termed sore throat.

Laryngitis and sore throat generally have their origin in atmospheric causes. Humidity of the atmosphere is the most common cause; but any sudden change, especially from dry to wet, is apt to bring on these affections.

Artificial causes, such as bad ventilation and bad stable management, are needed to aggravate the natural predisposition.

The earliest symptoms of laryngitis, combined with sore throat, are cough and difficulty of swallowing solids or even liquids. The mouth is hot, and the horse is disinclined to eat, or perhaps "quids" his hay, and only sips his water. The region of the gullet and fauces is hot and tender, and the least pressure on it produces coughing. The salivary glands throughout are swollen and tender. There is much slobbering from the mouth, and frequently, in bad cases, when the animal drinks, a portion of the water comes back through the nostrils, and occasionally part of the food is returned in the same way.

The pulse is quick and the respiration somewhat hurried. If the disease is not checked, the cough will become very hard and harrassing, and we may expect fever to supervene.

In the earliest stage the treatment consists in removing the patient to

a loose box with an abundant supply of fresh air. The diet must be restricted to soft food. The horse should be fed from a temporary manger, placed so as to suit the height, at which, in this disease, he generally carries his head. Grass is by far the best food; but when it cannot be procured, carrots or bran mash, or linseed gruel may be substituted.

If it is desired to produce a slight action on the bowels, two ounces of Epsom salts may be given morning and evening for two or three days, in a pint of water with two drachms of ginger. If the salt does not act on the bowels, it will do so on the kidneys. A tablespoonful of common salt may also with advantage be mixed in a bran mash. It will make the patient thirsty, and cause him to drink more freely.

Febrifuges, in the form of small doses of half a drachm of belladonna, and an ounce of nitre, made up into a soft ball or dissolved in water, may also be given.

A stimulant, such as mustard, or mustard and ammonia, may be beneficially applied to the throat and upper portion of the *trachea*, with the view of rousing the parts to a new and healthier action. When the disease is complicated with strangles, the persistent use of warm poultices or fomentations to the throat, and the opening of any tumors or abscesses, as soon as they begin to point, will assist in allaying the inflammation.

The strength must be supported, as much as possible, by careful attention to the appetite, and good nursing. Grass, carrots, or warm mashes may be offered in very small quantities at a time. Demulcent drinks, such as linseed tea, hay tea, or gruel, are useful and often acceptable. Water should always be within reach.

Steaming of the head with the vapour arising from boiling water poured on hay in a bucket, is generally very beneficial. If there is much irritability of the membrane, it will be advisable to pour four ounces of chloroform or chloric ether on the hay. The patient will inhale it along with the steam. In many cases the effect of this treatment in allaying irritation is very marked.

The warmth of the body must be maintained by clothing, and the legs should be wrapped in flannel bandages. At intervals, according to the circumstances of the case, the bandages should be removed, and hand rubbing applied until warmth is restored.

NASAL GLEET is the name given to a chronic discharge of mucus or muco-purulent matter, from one or both nostrils. In ordinary cases the matter is white and about the thickness of cream; sometimes it is clotty or lumpy. It is generally the sequel to colds and catarrh improperly treated. The horse may appear to enjoy good health.

Treatment.—Give the following powder three times a day until cured: Half a drachm sulphate of copper, one drachm pulverized gentian root, one drachm rozin, two drachms of ginger.

Another.—Seven or eight grains of cantharides with two drachms of gentian root.

POLL EVIL, as its name imports, occurs on the top of the head, just posterior to the ears. In its earliest stage, it is simply a swelling caused usually by the pressure of the head collar, or from an accidental blow.

If the cause be continued or repeated, inflammation will set in. As a result of the inflammatory action, the wound frequently suppurates, and after a time abscesses will form around the attachments of the cervical ligament.

From the peculiar position of the injury, the matter has no depending orifice, and hence, it generally happens, that unless artificial assistance by free incision is given for the escape of the matter, it will burrow downwards among and under the ligaments which support the head. Among these it is apt to form large and deep fistulæ.

These sinuses often extend down to the bone. The offensive smell of the matter contained in them will indicate this extension.

If the matter is suffered to remain long in contact with the bone it will probably cause caries in the tissue.

With moderate care and attention no case of real poll evil ought ever to occur.

When, however, the disease, by neglect and long-continued recurrence of the cause, has been suffered to develop itself, the treatment consists in laying the part open with a knife, so as to afford a depending orifice for the matter.

When the injury is deep-seated, it is good practice to assist the escape of the matter by inserting a seton through the sinus, with a view of affording it a depending orifice. The wound itself will require to be treated with a solution of sulphate of zinc, in order to excite the parts to increased action, and thus promote the healing process.

If sinuses have formed in different directions (which may be ascertained by the probe) each sinus must be laid open, as far as practicable, from its bottom by the knife, and treated as recommended above. But if the sinuses have been in existence a long time and have become lined with a very low-organized membrane, otherwise termed the "core," it may become necessary to cause sloughing of this membrane by the application of a stronger remedy—such as the powder of chloride of zinc—while the more external parts may be treated with lunar caustic. A radical cure will not be effected in a sinus so lined until the core is got rid of.

Great care must be taken to keep the wound open until it has thoroughly healed from the bottom; and for this purpose it will be necessary to insert into it a pledget of tow covered with digestive ointment. As the ligamentous tissues, among which the sinuses form, are of very low reparative power the process of cure is generally very tedious.

When the wound is well, great care must be taken to guard against recurrence of the causes which produced it.

In cases which have been long neglected, caries of the bone occasionally supervenes. From its position and from other causes this further development is so difficult to treat, and the process of cure so tedious and uncertain, that the better plan is to destroy the animal.

A well known veterinary surgeon gives the following paper on

Poll-evil.—In the treatment of this case, the patient should be confined on a light diet, and a potion of cooling medicine should also be given—ten or twelve ounces of Glauber salts dissolved in six gills of hot water. As soon as the liquid is sufficiently cool it should be poured down the throat from a smooth-necked champagne bottle. The tumefied parts should be kept constantly wet by means of bandages thoroughly saturated in a mixture composed of equal parts of pure cider vinegar and cold water. This treatment should be well persevered in for a few days. Should the tumor in the meantime increase in size and the parts develop much heat, a poultice of bruised flaxseed should be applied twice daily for forty-eight or ninety-six hours, or until the tumor manifests a fluctuating feeling. You will please note that no procrastination should be indulged in, such as waiting patiently for the tumor to break of its own accord, but as soon as the matter can be distinctly felt by pressure, make an incision slantingly with a sharp knife upon the right side of the neck at the base of the abscess. The incision or cut must not be made so deep as to come in contact with the spinal corn or marrow. The opening of the base of the tumor should be sufficiently large to allow the pus to freely escape as fast as it forms. A seton should be passed down from the natural opening at the top of the tumor, through the artificial opening made at its base. Before inserting the seton it should be dipped in tincture of cantharides. This will be found the safest and best plan to adopt for promoting healthy granulation and adhesion to the walls of the tumor. The fistulous track is not probably very long, and the tape seton will work its way gradually but efficaciously out, by which time the cure is made. A stimulus is also necessary to be applied to the interior of the tumor, by resaturating the seton, in three or four days after it is first inserted, with a solution made by dissolving ten grains of nitrate of silver in one ounce of cold water. This latter-

named stimulus should be applied twice per week, until a healthy discharge of pus appears; then stop. In the opening, from the top down to the artificial opening at the bottom, should be injected three times a week a stimulus composed of one drachm of chloride zinc dissolved in one pint of cold water. Apply the zinc lotion in half an hour after using the cantharides tincture and the nitrate of silver solution. The tincture of cantharides should only be applied once, and the nitrate of silver solution on the third or fourth day after, and continue as long as found necessary; but the zinc lotion should be applied once daily until a healthy granulation takes place; then every second or third day until the parts heal sound.

Pulmonary Consumption.—Prolonged disease of any sort, but especially of the liver, or even long-continued debility, sometimes lead to derangements of the lungs, which ultimately induce pulmonary consumption. The disease is the same as phthisis or consumption in man. A deep, loud cough, in the first instance, with falling off in the condition and an unhealthy state of the coat are marked signs of the disease. In the latter stages the hair becomes easily detached, and tubercles form in the lungs.

In pulmonary consumption we can hardly hope for much benefit from treatment. Careful feeding, moderate exercise, good grooming, tonics, and attention to the general health afford the best chance of arresting the development of the disease; but when tubercles have formed in the lungs the animal had better be destroyed. Their presence may be judged of from the nature of the discharge, which may be coughed up through the nose, together with rapid falling off of the animal in condition.

Pumice foot.—By horsemen and dealers this disease is usually denominated falling of the sole. It is caused by the softening, flattening of the whole hoof, the surface gradually becoming convex. Very little, if anything, can be done. A horse in this condition, if carefully shod, may be used for light work.

Quittor.—A disease of the hoof caused by a bruise or prick of a nail or by one foot caulking the other. Fracture of the coffin bone may lead to this disease. The horse goes very lame and shows signs of distress. It is best to call in the veterinary surgeon. Poultice the foot with flaxseed meal and use local injections to aid the discharge of matter.

Ring-bone is an exostosis, either on the upper or on the lower pastern bone; affecting in the one case the upper pastern joint, or in the other case the lower pastern or coffin joint around the coronet.

Ring-bone more often affects the hind than the fore fetlocks. The

degree of lameness is much greater in the lower than in the upper disease.

False ring-bone is an exostosis on the bodies of either of the above bones, not affecting or interfering with the joint.

Ring-bone is generally connected either with weakness and consequent sprain of the fibres of the lower divisions of the suspensory ligament, which are inserted into the anterior part of the coronet bone, or with sprain of the articular ligaments of that bone; or it may arise from concussion, or from a blow, tread, or other wound, or from any cause producing undue or unusual strain on the ligaments of or about the fetlock. From any of these or such-like causes inflammation may be set up in one or other or in both pasterns, and an ossific deposit may be the result. In some cases a predisposition to this disease appears to be hereditary.

Lameness arising from ring-bone (as is usually the case, when an osseous structure is affected) is more perceptible on hard than on soft ground. The special peculiarity to be noticed is some stiffness or want of flexion in the fetlock joint, and a consequent snatching up of the foot in action. Some swelling and heat is also, in most cases even in the early stage, apparent about the fetlock, and in a later stage increased heat will invariably be detected.

Whatever be the cause, rest, aided by cold applications, is the primary essential in the treatment. When the active inflammation is reduced, a blister, if the horse continues lame, may, as in other cases of exostoses, be beneficially employed, or ointment of biniodide of mercury may be rubbed in.

Concussion and strain on the ligaments will both be lessened by keeping the toes short, and still more by turning up the shoes at the toe. Leather under the sole is also useful in diminishing concussion.

Some practitioners recommend firing for this disease; but it is scarcely desirable to adopt a remedy which so seriously disfigures the animal in so prominent a part, until after rest and blisters have had a fair trial. If ultimately it should be necessary to have recourse to firing, the operation had better be performed with the budding iron, from the effect of which the marks will be less perceptible than the streaks made by the ordinary instrument.

ROARING is a very peculiar noise made usually in the act of inspiration, especially when the breathing is accelerated. In some cases it may be made both in expiration and inspiration. The sound is caused by obstruction in some part or other of the respiratory passages, and usually in the larynx.

The obstruction may be in the nose, and may consist of a tumor, or it

may arise from some accidental injury to or distortion of the windpipe; or it may possibly be caused by a band of lymph across the trachea, such as may sometimes become organized after a severe inflammatory attack; or by thickening of the membrane of the bronchial tube produced by inflammation, or by direct inflammation of the delicate membrane covering the larynx, which, in consequence, may afterwards become permanently thickened. A similar result may follow from the inflammation caused by a deep-seated abscess in strangles.

But the most common cause is paralysis and consequent atrophy of the crico-arytenoid muscles, which control the cartilages forming the upper and left side of the larnyx or box of the windpipe. The exact seat of the obstruction must be ascertained by auscultation whilst the noise is being made.

If the roaring proceeds from a tumor in the nose, it may be possible to remove it. If it be caused by an obstruction in the air-tube, arising from an injury or from the effect of an operation, it is possible that relief may be obtained by the application of a blister or seton. Bands of organized lymph across the trachea, or a band of that material round its interior are, we believe, irremovable, though instances are recorded in which they are said to have been excised. In recent cases, arising from distortion of the larnyx produced by tight reining up, the best treatment consists in removal of the cause and doing away with the bearing rein, followed, if necessary, by the application of a blister or seton to the upper part of the throat.

If the roaring arises from a thickened state of the membrane of the bronchial tubes, such as may often be found after catarrh, laryngitis, etc., relief may very probably be gained in recent cases by applying irritants, such as biniodide of mercury, repeated at intervals, to the exterior of the part affected, or a seton may be inserted on both sides.

STRANGLES is a disease usually attended with an eruptive fever, generally appearing about the period of adolescence. The horse appears sick and refuses to eat. In a day or two the glands under the jaw or behind the ear begin to swell. When the tumor forms regularly in the submaxilliary space, the abscess generally comes to maturity without much trouble. When ready to burst, apply the lancet to its most depending point. The bowels should be moved by giving eight or ten ounces of castor-oil. The disease has a tendency to get well naturally.

STRINGHALT.—The peculiar twitching, or sudden and convulsive picking up of the leg, known as stringhalt, is obviously due to some affection of the nerves.

In some cases it may be traced to the pressure of some exostosis on a

nerve; but as a general rule we are unable to account for the affection, nor does *post-mortem* examination always show any abnormal state of the nerves.

The disease varies very much in degree or intensity in various cases. It generally affects one or both hind legs, but it is also occasionally noticed in the fore leg.

In the early stage it is most easily detected when the animal is first put in motion, and also when he is in the act of turning. The disease generally increases with age, and though at first it may produce but little or no inconvenience, in the end it generally becomes not only very unsightly, but also seriously interferes with the action.

No treatment that we are acquainted with produces any beneficial effect.

THRUSH.—The seat of this disease is the sensitive frog, from which issues an offensive discharge. Contracted feet, continued paring of the frog, and damp stalls are some of the causes of this disease.

Wash the foot thoroughly with warm water and castile soap, and wipe it dry. Remove to a dry stall and sprinkle powdered blue vitrol in the crevices. If the disease is long standing, tonics may be administered.

WHISTLING is a modification of the noise called roaring, and requires the same treatment.

ACTION AND USES OF MEDICINES.—The object with which medicine is given is to produce an altered—it may be an increased or it may be a diminished—action of some organ of the body or of the system generally.

CLASSIFICATION OF MEDICINES.—Medicines may be roughly classed under the following heads, namely:

1st. Evacuants, which increase the secretions from the bowels, skin, or kidneys. They are respectively termed purgatives, diaphoretics, and diuretics.

2d. Depressants, including sedatives and nauseants, which lower the action of the heart and nervous system.

3rd. Stimulants, which rouse and excite the action of the heart and nervous system.

4th. Narcotics, which exert a primary stimulant, and secondary but more permanent sedative effect.

5th. Tonics, which impart tone and vigor to the system.

The above medicines act on the system generally. The following exert chiefly a topical action:

6th. Blisters, which cause irritation of the skin.

7th. Caustics, which decompose solid tissues and fluids.

8th. Astringents, which constringe muscular fibre, repress undue granulations, and cause contraction and condensation in the part to which they are applied. In more familiar language, they dry up sores, and induce the formation of a scab.

9th. Demulcents, which act locally by protecting, so far as they reach, in an undiluted form, the lining of interior parts

10th. External dressings, which in cases of abrasions of the skin, wounds, sores, etc., are useful in protecting exterior parts from the irritating effect of the air, and from flies, etc.

11th. Emollients, which soften and relax the tissues, and thereby lessen pain, and allow the blood congested in the part to flow away more easily.

12th. Cold applications, which constringe the structures, abstract heat, and moderate inflammatory action.

Mode in which medicines produce their effects.—Most medicines which are taken internally are absorbed into the blood and circulation generally. But though absorbed, they do not seem to be assimilated with it or with the structures of the body. On the contrary, they are speedily ejected from the blood by their appropriate excretory organs. This is especially the case with the large class of medicines included under the comprehensive title of evacuants. They seem to produce their principal effect during the process of ejection, the organ through which they are excreted, being excited to increased action.

Medicines, however, do not produce the same effects in all states of the system. Their effects, even if not positively determined, are often much modified by any morbid changes which may have taken place. Some medicines, indeed, are completely changed when introduced into the system. Alkalies, for instance, are neutralized when they meet with the acid of the gastric juice.

Again, most medicines which produce an effect on the skin, act also in a certain degree on the stomach, intestines, or kidneys, because they are more or less absorbed into the system, especially if applied in large quantities.

Some medicines are believed to produce their effects by acting on the nerves of the part, which absorb or excrete them.

Though we can explain, in some degree, how medicines produce their effects, yet we cannot explain why particular medicines affects particular organs,—why, for instance, aloes acts on the intestines, and resin on the kidneys. It is only by continued observations and experiments that these effects have been ascertained to be facts. In applying medicines to the treatment of disease we endeavor to utilize our knowledge of facts, though we cannot always explain the reason of them.

Purgatives.—Some purgatives seem to act generally on the intestinal canal. The effects of others are confined to the large intestines, but the great majority produce their effect on the small intestines.

Though the immediate action of purgatives consists in causing evacuation of the contents of the intestines, they also produce an effect on other organs; because the intestines, when excited to increased action, draw off secretions from all parts. Thus, a dose of purgative medicine will often reduce swelled legs, because the increased action of the intestines drains off the watery parts of the blood from other portions of the system. Again, they often are useful in carrying off those noxious matters, which from impaired secretion during disease are apt to accumulate in the blood, and tend, if not removed, to keep up fever and inflammation.

Although the active operation of purgative is only temporary, yet their results are often permanent. By their action the intestines are relieved from undigested materials or accumulated fæces, the blood is freed from impurities, and the liver and other excretory organs are r used to healthy action.

Before purgative medicine can be safely given, it is absolutely necessary that the horse should be well "prepared for physic,"—that is, deprived for at least thirty-six, and if possible forty-eight hours, of all food except cold bran mashes, which are in themselves laxative, and tend to assist the action of the medicine. Physic does not take any effect until it is brought into contact with the mucous linings. If the stomach and intestines are full, the purgative may never reach those linings. It may pass through with a mass of food, and its properties may not be extracted, or it may act violently in a mass on the part of the lining which it reaches. On the other hand, when the stomach and intestines are somewhat empty, the medicine is diffused over a large tract of mucous surface, and acts more speedily and more safely.

After the administration of the medicine the patient should be freely supplied with tepid water. If, however, he refuses tepid water, he may be allowed water from which the chill has been removed by allowing it to stand for a few hours in a warm room or kitchen. The diet must be restricted to sloppy bran mashes. A little walking exercise or a gentle trot for a few minutes will sometimes also be needed to cause the medicine to operate. With a similar view an enema may be given.

Six or seven evacuations are quite sufficient, though grooms generally like to see a dozen.

So far as the action of the purgative is concerned, a horse moderately purged may generally be put to work in about three days after the physic has ceased to operate, or "set," as it is technically termed.

A dose of physic is very apt to carry off a weakly patient from over-effect; but in some cases of fever attended with great debility it may remain inoperative from want of tone in the system. Balls which have been given several days previous are sometimes found whole in the intestines after death.

Some purgatives do not act directly on the intestines, but produce their effects indirectly by exciting organs in connection with them, such as the liver and glandular structures.

The administration of purgatives is always attended with some danger, and therefore it is desirable to use the smallest quantity which will produce the required effect.

Horses difficult to affect with purgative medicines.—If it is found difficult to move the bowels of any particular horse with medicine, it is a good plan, in addition to the usual preparation, to put him on linseed meal and bran mashes for a further twenty-four hours before the administration of the dose. If in the end the physic does not act, the stinting of the food will probably have done as much good as the medicine would have done. It is a mistake to give an increased dose in such cases, or to suppose that the medicine will do any harm if it does not pass off visibly, by remaining in the system. Its effect is in reality simply negative. In many cases, however, the medicine is passed off by the kidneys.

Super-purgation.—If the purging continues over long, and wheaten flour mixed with the water fails to stop it, some rice-water gruel made rather thick may be given frequently, and in small quantities at a time, and also hay and a little bruised corn mixed with dry bran. The patient should be kept very quiet and warm. His legs should be wrapped in flannel bandages, and his body, especially the belly, kept warm with clothing. Astringent and nutritive enemata are often recommended in such cases, but their utility is very doubtful.

Purgatives not to be given to a weak horse.—Purgatives rapidly reduce the strength, partly by causing the food to pass more quickly through the intestines, and thereby giving less time for the absorption of its nutritious parts, partly by the increased secretions they draw from the system, and partly by the nervous prostration they induce.

Purgatives, therefore, should not be given to a horse in a weak state, because he cannot bear further weakening; nor, except in very reduced quantities and with the greatest caution, in diseases of the lungs or air passages. In these cases the animal is always weak on account of the blood not being properly purified in the lungs. And again, on account of the active sympathy existing between the mucous lining of the air

passages and that of the alimentary canal, there is always reason to fear that the inflammation already established in the one may extend to the other. Under such circumstances physic is very likely to cause super-purgation.

Aloes is by far the best and safest purgative. Cape and East Indian are inferior to Barbadoes, chiefly on account of the greater proportion of resinous matter they contain. Aloes is usually and most conveniently given in the solid form as a ball. Four or five drachms are a sufficient dose for most horses, if properly prepared; but large, heavy horses may perhaps require five or six. It usually operates in about twenty-four hours.

An aloetic mass will be best compounded as under aloes, two pounds; palm oil, two pounds and a half; ginger, one-half pound, melted together in a water-bath.

The quantity to be weighed out for a ball will therefore be double that of the weight of aloes intended to be given.

Aloetic medicine should not be made up in balls until required for use, but should be kept in a mass in a glass-stoppered bottle. When divided into small portions, as in balls, it soon becomes dry and hard, and is then uncertain in its effects.

Aloes in solution.—Aloes in the solid form contains a resinous principle, and hence is sometimes excreted by the kidneys. In making the solution the resinous matter rises to the top, and may easily be skimmed off. Hence the solution becomes a purer medicine, and may preferably be given in some cases where the admixture of resin contained in the solid form would be injurious. Its action is also quicker.

The solution is made by dissolving four or five drachms of aloes in a pint of hot water with two drachms of powdered ginger and an ounce of aromatic spirits of ammonia; or half the above quantity may be dissolved, and half a pint of linseed oil added with two drachms of powdered ginger. The drench should be well shaken before being given.

Practically, however, there is always an objection to giving drenches to the horse when it can be avoided, because an uncertain proportion of the medicine is usually spilt and lost in the administration.

The action of aloes, whether in the solid or liquid form, may be increased by combining it with gentian. Thus, in lieu of five drachms, four drachms of aloes may be given with two drachms of tincture of gentian.

Linseed oil taken internally is a purgative. It is less safe and less certain than aloes, but is preferred in some cases, because it produces less irritation of the intestinal linings than aloes.

Croton farina is a very powerful but dangerous purgative, and is only given in extreme cases of constipation. It acts rapidly and causes watery evacuations. It is difficult to stop the purgation induced. It sometimes causes inflammation of the intestines.

Saline substances, such as sulphate of magnesia or Epsom salts, are also used as purgatives. In addition to their purgative properties, they seem to alter the condition of the blood and to diminish its tendency to coagulation in certain diseases. Hence in fevers they are often administered with benefit; but as a rule they are neither so safe nor so certain in their action as aloes.

Clysters, otherwise called enemata, soften and loosen the hardened fæces, and also by mechanically distending the lower gut, cause it to evacuate its contents. The excitement of the lower intestines sometimes extends forward and arouses the small intestines to action. The water should be of the temperature of new milk. The quantity of water thrown up at once should not exceed half a gallon. No violence should be used in forcing it up. The gentle and gradual pressure of the bladder, or leather bag, is quite sufficient. The object of an enema is not to wash out the patient's inside, but simply to rouse the powers of nature to evacuation. Purgative enemata usually consists of warm water only; but if a more stimulating effect is desired, common salt, oil, or solution of aloes may be added. Before administration the horse should be back-racked.

Nutritive enemata, consisting of gruel or rice-water, are beneficial in cases where the patient is unable or unwilling to take food by the mouth. They should not exceed a quart in quantity. If larger they will probably be ejected.

Astringent enemata, made of two drachms each of catechu and opium, or a quart of starch in a gallon of water, are said to be useful in checking diarrhœa.

Sedative enemata are made by adding about two ounces of opium to the water. They are said to be useful in allaying spasms in the intestines. Their utility is, however, extremely doubtful. Gaseous enemata, consisting of tobacco smoke, are also used for a similar purpose.

Enemata, consisting of two ounces of oil of turpentine, diluted with a pint of olive oil, are recommended by some veterinarians for the purpose of killing worms in the large intestines.

Diuretics are medicines which act on the kidneys, and cause increased secretion of urine. Like purgatives, they are absorbed into the blood, but not being assimilated are ejected from it, and excreted through the kidneys. During excretion they cause irritation, and hence produce in-

creased secretion. The body should be kept cool during the period of their administration. Though the bowels cannot always be acted on, the kidneys are very easily affected.

The diuretics in common use are resin, turpentine, etherous substances, and small doses of nitre, acetate of potash, or other saline matters. The latter, however, if given in large quantities, are excreted by the bowels.

Diuretics, though acting locally on the kidneys, affect the whole system, because the secretions which they induce are drawn from the system generally, as explained under the head of purgatives. Hence, they are given in fevers, with the view of removing from the blood those deleterious matters which in such cases always accumulate in the system from suspension of the secretory powers. They are also employed to remove from the body excess of fluids or "humors," as they are popularly called, as in cases of swelled legs.

The kidneys themselves are rarely affected primarily. Affections of the urine generally arise from derangement of the digestive organs. If the kidneys get into a chronic state of torpidity, the cause will probably be found in want of tone in the system. The true remedy in all such cases lies in good feeding, air, exercise, and proper attention to stable duties, rather than in the administration of diuretics.

Diuretic balls are generally made of two drachms each of resin and nitre, with one drachm of Venice turpentine, mixed in a mass with soft soap and linseed flour.

Diaphoretics.—The skin is the channel through which the system excretes a large, though variable, amount of refuse fluid matters holding in solution various salts and effete organic matters. It has been estimated that as large an amount of matter is passed off through the skin of a horse in high condition and active exercise, as by all the other excretory organs. Hence exercise, occasionally, at least sufficient to produce a good sweat, is essential to health.

During those diseases in which the functions of the kidneys, lungs, or bowels are more or less disturbed, and when exercise cannot be taken, it is often of great importance to maintain, and, if possible, increase the action of the skin in order to prevent the blood from being poisoned by the accumulation of deleterious matters in it.

Diaphoretics are medicines used to increase the action of the skin by stimulating the cutaneous glands and vessels. They answer well, and are frequently used in the human subject; but in the horse, partly on account of the hair with which the skin is covered, and partly on account of the tendency of the medicine to be passed off by the kidneys and bowels, they are not very available. The best practical method of

causing diaphoresis in the horse, is to administer diluents in large quantities, then to apply friction over the body, and to keep the animal well covered with double clothing in a warm atmosphere. A Turkish bath, if available—but this is rarely the case—will produce the desired effect.

Depressants proper are those agents which, such as blood-letting, depress the nervous force and system generally. Under the general head of depressants, however, it is usual to include also sedatives, which abate the nervous force without causing such positive general depression; and nauseants, which, as the name expresses, lower the tone of the system by producing nausea.

It will readily be seen, that though a broad distinction may be drawn, yet no sharply defined line divides these agents.

Bleeding is a most powerful and certain depressant and sedative. It lessens the action of the heart and lungs. It produces this effect mainly by diminishing the quantity of blood in circulation, and it also acts in some not very easily ascertainable way on the nervous system.

When it is thought necessary to employ it, blood enough should be taken to produce a marked alteration in the character of the pulse. The blood should be drawn in a full stream, so as to produce the effect as quickly as possible. If bleeding is resorted to at all, it should be in the very early stage of disease, before the strength fails.

Bleeding, however, is not a safe remedy. As a general rule it should be avoided; and if there is any doubt as to its advisability, it is always safer not to bleed. Far more horses are killed than saved by this remedy.

Bleeding is always injurious when the pulse is quick and weak. The prevalent idea, that a quick pulse necessarily indicates the presence of inflammation, is wholly erroneous. Such a pulse far more often results from a weak and perverted state of the system, which bleeding will seriously, if not fatally aggravate. Bleeding is especially injurious in the later stages of diseases of the lungs and air passages, because in them the patient is always weak on account of the blood not being properly purified in the lungs.

Sedatives are distinguished from depressants, in that they abate the nervous force without causing positive general depression. Sedatives may be divided into two classes, namely, those which possess a general, and those which have only a local action. Aconite, which acts by lowering the action of the heart, is an example of the first; whilst warm water, which assuages local pain, may be taken as a type of the latter.

Aconite is a prompt and effectual sedative in febrile attacks, and in acute inflammation. It moderates the action of the heart, and hence

reduces the quantity of blood which passes in a given time to any part. It thus acts much in the same way as bleeding, and has the advantage of not reducing the strength like loss of blood. In a large dose it is highly poisonous; but the tincture may be safely given in doses of from ten to twenty drops frequently until the pulse is relieved.

Digitalis, tartar emetic, hydrocyanic acid, and belladonna.—Digitalis operates in much the same way as aconite, but is neither so safe nor so certain. In large doses it causes intermittent pulse, and in excess may produce coma and even death. It is apt to accumulate in the system, and symptoms of poisoning may set in, after its use has been continued for some time, or even after its administration has ceased. Its action, therefore, should be carefully watched. The usual dose is a scruple three times a day.

Tartarized antimony, otherwise called tartar emetic, though powerful in its effect on the human subject, acts but very slightly, if at all, on the horse.

Hydrocyanic acid is also used as a sedative, but is not a safe medicine in inexperienced hands. Half to one drachm is the usual dose.

Extract of belladonna, in doses of one drachm with one or two drachms of nitrate of potassa, is also employed.

Nauseants.—Although certain peculiarities in the position and structure of the stomach prevent the horse from vomiting except in rare instances, yet nausea sufficient to keep an irritable animal quiet may be produced by giving one or two drachms of aloes every other day. In certain cases, such as broken knees, the important object of keeping the patient quiet is sometimes only to be attained in this way.

Stimulants and diffusible stimulants.—The internal stimulants used in veterinary practice are chiefly those known as diffusible stimulants. They cause rapid, but only temporary, excitement of the system. They are very useful in rousing and equalizing the circulation, which from any cause may have become languid or even almost paralyzed. In shivering fits, for instance, diffusible stimulants may by this action ward off attacks of inflammation. Shivering, which is a marked premonitory symptom of such attacks, is produced by the blood being suddenly driven from the surface of the body to the internal organs. They also relieve the congestion of internal organs by exciting the general circulation. Hence they are employed in many diseases, especially in inflammation of the lungs.

Diffusible stimulants are of the highest value in febrile affections, in diseases attended with great depression, during convalescence after serious illness, and in all cases of prostration, etc.

The ordinary dose consists of spirits of nitrous ether, one ounce; aromatic spirits of ammonia, one-half ounce; solution of acetate of ammonia, three to four ounces; water, one pint; or, aromatic spirits of ammonia, one ounce; tincture of gentian, one ounce; water, one pint.

Narcotics exert a primary stimulant, but more permanent sedative effect on the brain and nervous system. They are given with the view of relieving pain. Combined with other appropriate remedies they are useful in alleviating spasms, and the pain of some wounds and injuries.

Opium, Indian hemp, belladonna, camphor, and tobacco smoke are the narcotics in most common use. Belladonna and camphor and opium are especially valuable in relieving pain.

An ordinary dose may consist of opium, one to two drachms; with or without camphor, one to two drachms. In cases of inflammation of the bowels or liver the above may be combined with half a drachm of calomel.

Anti-spasmodics are medicines which act upon the brain and nerves, and through them on the system generally. By their action they overcome inordinate muscular action, such as spasms.

They usually consist of a narcotic, in combination with a diffusible stimulant and a slight purgative. An anti-spasmodic draught may be made of spirits of nitrous ether, two ounces; tincture of opium, one ounce; solution of aloes, four ounces; or, oil of turpentine, two to three ounces; tincture of opium, two ounces; linseed oil, one pint.

Anæsthetics, such as chloroform and ether, are somewhat allied to narcotics, but possesses, in addition, the wonderful property of causing temporary insensibility to pain and external impressions. Although at present but little employed in veterinary practice, their use will probably become more extended.

Tonics are agents which increase the general tone and vigor of the system without producing any sudden reaction. They are supposed after being first taken into the circulation to act through the nervous system on the contractile involuntary muscular fibres of the alimentary canal and circulatory system, thereby inducing a more healthy state of primary and secondary nutrition.

They increase the appetite, the fullness and firmness of the pulse, the activity of all bodily functions and muscular power. Preparations of iron appear to be especially useful in improving the condition of the blood by increasing the amount of air contained in that fluid.

These beneficial effects, however, are only produced when the system has need of such artificial stimulus. When given to healthy animals tonics produce constitutional disturbance and ill health.

They differ from diffusible and other stimulants in that their action is but slowly established, whilst their effects are tolerably permanent, and their administration is not succeeded by subsequent depression.

Tonics, especially mineral tonics, should not be given to horses except under the advice of a well qualified veterinary surgeon. Even in the human subject great care is required in their administration; but they may be more safely given, because the effect which they are producing can be ascertained daily by inquiry from the patient. In the horse, however, we have not this advantage. We may watch for, but we cannot positively ascertain their effect, until, perhaps, they have produced a marked result, either for good or for evil.

The medicinal tonics in ordinary use are divided into the two heads of mineral and vegetable. The first-named comprise salts of iron and copper, disulphate of quinine and arsenic. They are generally given with the food. The vegetable tonics in common use are infusions of gentian, quassia, and cinchona. Ginger, aniseed, and other aromatics, have also a slight tonic effect. Mineral are far more powerful than vegetable tonics.

The cordial balls so much patronized by grooms generally, contain as their principle ingredient some mild tonic, such as gentian, cardomon seeds, etc.

The really best tonics for the horse, except after seriously debilitating illness, are good, fresh, cool air, well regulated exercise, good feeding, and good grooming.

Of mineral tonics the ordinary dose may consist of sulphate of iron, one to two drachms, with two to four drachms of ginger; or, sulphate of copper, one-half to one drachm, with tincture of gentian, two to four drachms; or, arsenious acid, five grains.

Though the above are the ordinary doses, yet it must be remembered that mineral tonics are very powerful, and even dangerous medicines, unless their effects are closely watched. Hence the amount and frequency of the repetition of the dose may often require to be varied under the ever-changing circumstances of the patient.

Of vegetable tonics the ordinary doses are, quinine, one-half to one drachm, dissolved in a few drops of sulphuric acid and a pint of water; or, oak bark, two to three drachms made into a ball with treacle and bran; or, tincture of gentian, one to two ounces in a pint of water.

In some cases the above quantities may be doubled.

Though in a far less degree than mineral, vegetable tonics are powerful for good or for evil, and the effects which they are producing require to be carefully watched.

Blisters, by means of their irritant action, produce inflammation of the true skin, and, as a result, effusion of the watery parts of the blood. This effusion appears in the form of vesicles or blisters which raise up the cuticle from the skin underneath.

Blisters are used either as local stimulants, or as irritants with a view of causing an altered, and it may be a healthier action, or as counter-irritants.

When the first or mere stimulant action is desired, the blistering liquid is applied sparingly. By such stimulation more blood is brought to the part affected, and increased action is the result. With this view blisters are applied to indolent wounds and ulcers, to parts from which the hair has fallen off, and to the coronet, in order to stimulate the growth of the hoof. When an irritant effect is desired, as in some cases of sprains of tendons or ligaments, the blistering liquid is applied more freely. When counter-irritation is sought for, the liquid is applied freely over a considerable extent of surface.

The agents in use for the purpose of producing stimulation, irritation, or counter-irritation, are of various degrees of severity, from the temporary superficial redness caused by simple friction, to the deep and severe action of the actual cautery.

Caustics act by chemically decomposing solid tissues and the fluids. This action destroys the vitality of the part. They are, therefore, much used in cases of unhealthy granulations, otherwise called proud flesh.

Although they destroy the structure with which they come in immediate contact, yet they cause irritation and increased action in the adjacent parts. Hence, they are often made use of for the cure of indolent wounds and ulcers.

Some of them possess the property of uniting with albuminous matters, which renders them effectual in coagulating blood and thus stopping hemorrhage, and likewise in producing an eschar or scab over painful or irritable sores or wounds.

Caustics differ much in intensity. Those in common use are nitrate of silver, otherwise called lunar caustic, bluestone, or sulphate of copper, sulphate of iron and zinc, sulphuric and hydrochloric acids, arsenic, corrosive sublimate, perchloride of antimony, and the hot iron or actual cautery. These agents are apt to be much abused, being frequently applied in too strong a form or in too great quantities. Inexperienced people, in their desire for a decided effect, too often forget the delicate nature of the living structures with which they have to deal, and the pain which such rough treatment gives.

Equable well applied pressure, though not a caustic, deserves to be

mentioned in this place as a valuable agent in repressing unhealthy or excessive granulations.

Nitrate of silver is the most convenient application for repressing too luxuriant granulations, or for promoting healthy action in a sore. Corrosive sublimate is frequently used with advantage in quittor to promote healthy action in the sinuses. Red percipitate induces healthy action in a sore. Nitric acid, applied by means of a piece of tow at the end of a stick, is used in fungus on the sole of the foot.

Astringents partake, though only in a modified degree, both of the action of caustics and tonics. Like caustics they combine chemically with albuminous and watery matters, whilst like tonics they act on, brace up, and constringe muscular fibre.

When given internally they are useful in arresting excessive secretions of the mucous membranes and in bracing up relaxed parts. Hence they are often given in cases of diarrhœa.

When applied externally, they are beneficial in several ways. They suppress excessive secretions, and hence hasten the formation of healthy cicatrices, and promote the process of healing generally. They check the formation of unhealthy granulations, whilst, moreover, their constringing action renders them serviceable in reducing superficial inflammations, such as that arising from slight contusions, from inflammation of the mucous coat of the eye, etc.

Internally, opium, catechu, sulphate of zinc, acetate of lead, and rice-water are administered. In profuse staling, iodine has a very marked effect.

For external cases, alum, the acetate of lead and zinc, and sulphates of zinc, iron, and copper are used. Ice, cold water, and cold generally, though they have no chemical effect, deserve places among astringents by virtue of their action in bracing up muscular fibre. All caustics, if much diluted, have an astringent action.

For an astringent ointment, equal parts of burnt alum and chalk, or of alum and pipe-clay, answer particularly well. In cases of indolent sores, an ounce of sulphate of copper to a pint of water may be used.

An astringent lotion may be made by dissolving in water as much powdered sulphate of zinc or acetate of lead as it will take up, or equal parts of the above may be dissolved together. The lotion may be reduced in strength by adding water according to the nature of the wound to which it is to be applied. An ounce of salt dissolved in a pint of water also forms a very useful, mild, astringent lotion.

Demulcents have a purely local action. When taken internally they form a coating, so far as they reach in an undiluted form, to the mucous

linings, and protect them from irritation. In sore throat, for instance in ourselves, we readily recognize the benefits of demulcents in protecting the mucous lining of the throat from the irritating effects of cold raw air. They are also serviceable in preventing acrid secretions from coming in contact with delicate and irritable surfaces. Hence they are given in cases of diarrhœa.

Demulcents are made either of linseed boiled to a jelly and mixed with the food, or by pouring boiling water on the seeds in the proportion of one pint of water to an ounce of seed. The latter must be left to stand till cold, when a thick solution will be obtained.

External dressings in cases of wounds are useful in protecting the parts from the irritating effects of the air, flies, etc.; and, secondly, in lowering the temperature of superficial inflamed parts.

For the first-named purpose, cotton, wool, or strips of cotton dipped in collodion, or a rag wetted with goulard lotion, or cold water, answer well. Carbolic acid made into paste with chalk, or collodion applied over the part with a camel's hair brush, will often be found useful in forming an artificial eschar over a sore. For the second-named purpose, a rag kept wet with water, or with a refrigerating lotion, may be used.

To prevent attacks of flies, which in hot weather are especially apt to be troublesome, the parts may be lightly smeared with spirits of tar, naphtha, or diluted carbolic acid. In hot climates much of the success in treatment of wounds and sores depends on keeping off flies. Maggots in a wound will be best got rid of by dressings of equal parts of spirits of turpentine and oil.

Under the head of external dressings are also included the applications used for mange, lice, etc. These will be given under the heads of the diseases to which they respectively refer.

Digestive ointments, for which some recipes will be found in the next paragraph, are also much employed; but the benefit derived from their use is questionable.

Digestive ointments.—Turpentine liniment is much employed as a rubefacient, and as a digestive ointment on abraded surfaces. It is usually made as follows: Oil of turpentine, one part; olive oil, four parts.

Compound liniment of turpentine is used when a more stimulating effect is desired: Oil of turpentine, eight ounces; camphor, one ounce; soft soap, four ounces. To be shaken together till mixed.

Diluents.—When dissolved in a large amount of water demulcents act as diluents, which, as their name indicates, dilute the blood and other secretions. They are useful in certain diseases in diminishing the irritating properties of unhealthy secretion. In irritability of the bladder,

for instance, they are serviceable in diluting the urine, and thus diminishing irritation in the mucous lining of that organ.

Emollients.—Fomentations and poultices, otherwise termed emollients, by virtue of their heat and moisture soften, relax, and soothe the parts to which they are applied. Hence they are used in cases of recent sprains, colic or gripes, in enteritis, in bruises, and in all such cases. They are also serviceable in cleansing wounds in which dirt or gravel may have lodged.

But simple as they are, emollients may be used too freely or too long, or until they unduly relax the parts, or, in the case of wounds, induce undue effusion and suppuration, and in some cases excessive granulations.

The lymphy fluid poured out from the adjacent healthy structures is the material intended by nature for the cementing of wounds and for the repair of lacerated structures. From it the muscles, skin, bones, and all other parts are built up; and hence in the treatment of wounds care must be taken not to interfere with the reparative material or ignorantly remove it.

The simple rule appears to be, that emollients are useful in the first instance in reducing the inflammation, and may in many cases bring about resolution; or, if the progress of inflammation cannot be checked, they may be advantageously continued with the view of bringing on the processes of effusion and suppuration. But as soon as this action has been induced, the emollient should be discontinued, because the object of its application has been attained.

Poultices intended for the special purpose of giving warmth to a part, are usually made of hot bran. Those intended for relaxation may be made of equal parts of moist bran, linseed meal, and olive oil; or of boiled carrots or turnips mixed with bran. For ill-conditioned sores linseed answers best. If a sore is painful, opium may be added to any of the above. To soften the horn in inflammation of the feet, vinegar may be added to the bran. A poultice may be made an astringent dressing by the addition of sulphate of zinc.

Poultices, though very convenient in the human subject, are not equally applicable in the horse, because they are not easily fixed, except on the feet. A poultice, unless made large, dries too rapidly, and is then apt to cause irritation instead of soothing. On the other hand, if made large, it is heavy and difficult to secure. The poultice must not be tied so tight as to arrest the circulation or to leave a mark. With this view a broad tape or a piece of list should be used instead of a string. An old stocking with part of the foot cut off makes a good poultice bag for the lower part of the leg.

The substance of which the poultice is intended to be made should be steeped in hot water in a cloth. The water must then be permitted to drain off.

Fomentations.—Hot water makes the best fomentation, and is only open to the objection that its use demands from servants an amount of time and trouble which they are not very willing to give unless closely superintended.

Spongeopiline.—For sprains and bruises, when the skin is not broken, a thick, woollen substance covered with oilcloth, called spongeopiline, which is manufactured for the purpose, forms a good but still inferior substitute for the more troublesome operation of fomentation. It should be soaked in hot water, and on account of its thickness and impervious covering, will long retain both heat and moisture.

Cold applications resemble fomentations in so far as that their action is local; but in other respects their action is diametrically different. They constringe, harden, and brace up the parts to which they are applied. They reduce the calibre and increase the tone of the distended or relaxed superficial blood vessels, rouse them to increased action, and excite them to absorb the effused products of hyperæmia. They also lower the heat of the part to which they are applied. Hence their value in the treatment of sprains after the first heat and tenderness have passed away, and also in reducing bruises and removing simple superficial circumscribed inflammation.

Of cold applications, cold water is the most common and convenient. Poured from a height it is sometimes specially effective. Its temperature, if need be, may be lowered by dissolving in it ice and salt, or a mixture of equal weights of common salt, nitre, and muriate of ammonia. Vinegar is sometimes mixed with the water, and is useful where an astringent and refrigerant effect is desired. Powdered ice is also a valuable means of abstracting heat. An ingenious india-rubber apparatus is now made for allowing cold water to trickle down over any required part.

Cooling and refrigerant drinks, though less commonly used in veterinary than in human practice, are refreshing and sometimes palatable to sick animals. They often also exert a slight tonic action, and generally in addition increase the secretions of the bowels and kidneys.

Cooling drinks are made by dissolving in water saline matters,—such as four drachms of nitre or cream of tartar, or four ounces of the solution of acetate of ammonia in a gallon of water. Or acids,—such as two or three ounces of vinegar, or one or two drachms of hydrochloric acid may be mixed in the above quantity of water. Many horses, however, will refuse the water when so mixed.

Cooling lotions.—Acetate of ammonia, four ounces; spirits of wine, four ounces; water, eight ounces. Mix and keep the part wet with a rag. Or, sal ammoniac, one ounce; vinegar, four ounces; spirits of wine, four ounces; water, eight ounces. Mix the sal ammoniac and vinegar together, and then add the spirits of wine and the water. Or, sugar of lead, one-half ounce; vinegar, two ounces; water, one quart.

Alterative balls.—By slightly provoking the action of the excretory organs alteratives are sometimes useful in enabling the system to rid itself of any waste materials or matters which, if retained, might cause disturbance of health. They may be made of nitre, black antimony, and sulphur, two drachms each. Or a mass may be made of aloes in powder, four drachms; soft soap, four ounces; linseed meal and treacle, twenty-four ounces. Or, aloes in powder, eight drachms; soft soap, eight ounces; linseed meal and treacle, sixteen ounces.

Dose of either of the two latter, one ounce.

Febrifuges.—Camphor, one drachm; nitre, two drachms. Make into a ball. Or, nitre, two drachms; Epsom salts, one to four drachms. Dissolved in a pint of water.

Fever balls.—Camphor, half a drachm; nitrate of potassa, two drachms. Mix in treacle and linseed meal.

Fever or cough balls.—Aloes, one drachm; nitrate of potassa, two drachms; extract of belladonna, half to one drachm, according to the size of the horse. To be mixed with tar into a ball.

Disinfectants and deodorizers.—True disinfectants act chemically by decomposing noxious gases and organic matters. Such are chlorine and its compounds, sulphurous acid, Macdougal's disinfectant, Condy's fluid, chloride of lime and soda, carbolic acid, etc. Their action is produced by their affinity for hydrogen, which is a constituent of most of the deleterious matters found in the stable. They appropriate to themselves this constituent, and by this means break up the poison. Most disinfectants are also deodorizers.

Deodorizers generally, as distinguished from disinfectants, act mechanically. They have an affinity for certain compounds floating in the air, and imbibe and absorb them. Such are sawdust, powdered wood charcoal, plaster of Paris, sulphate of iron, gravel, sand, and permanganate of potassa.

Deodorizers may, under some circumstances, become so overcharged with noxious matters, that they may of themselves voluntarily give them off. Earth, for instance, which is a most valuable deodorizer, may become so loaded with impurities as to become stinking. Similarly, disinfectants

can only combine with a certain proportion of noxious gases or organic matters, and then become inert and valueless.

Along with plenty of fresh air and due regard to cleanliness, disinfectants and deodorizers are useful means of purifying the air of stables, and also in neutralizing those noxious emanations given off from the bodies and breath of diseased animals, which, if undiluted or destroyed, may become fruitful sources of diseases. It must never, however, be supposed that they supersede or even diminish the necessity for adequate ventilation and scrupulous cleanliness.

Antiseptics are agents used to prevent or hinder putrefaction. According to modern views, putrefaction is excited or occasioned by living microscopical animaculæ, or plants, which floating in the air feed upon and decompose dead animals and vegetable substances.

The class of medicines termed antiseptics act as poison on these bodies and destroy their activity. They check that slow breaking up of organized bodies which is termed putrefaction, by destroying its causes. Sulphurous acid, common salt, astringent metallic salts, vegetable substances rich in tannin, sugar, spirits, creosote, and pitch oils and carbolic acid, are the antiseptics in common use.

Antiseptics are used in veterinary practice in the treatment of unhealthy sores and wounds, and occasionally with the view of arresting caries and gangrene.

They were at one time given internally in the belief that they counteracted general putrescency of the solids and fluids. But they are not now administered for such purposes, as it is well known that putrefaction never occurs except in such organized matter as has passed beyond the pale of vitality.

Mode of delivering a ball.—There is a good deal of knack in delivering a ball. It should be delivered by the hand, not at the end of a stick or by a balling gun. The tongue should be slightly drawn out and pressed to one side by the left hand of the operator, but it should not be pulled far out of the mouth. The head should be raised whilst the ball is being put into the mouth; but the moment the ball is at the root of the tongue, the head should be let down level with the body, because it is only in that position that the horse can naturally perform the act of swallowing.

The head should not be let completely down, because in that position the skin and muscles of the neck are so relaxed that the passage of the ball down the throat cannot easily be watched. The downward passage of the ball is best seen on the near side, because the gullet lies towards that side. If the ball does not go down at once, a gulp of water or a

handful of grass should be given. The throat must not be rubbed or pressed upon with the view of assisting the passage of the ball. Any such "assistance" will probably induce cough, and cause the ball to be ejected.

To those who have not had much practice, a balling iron is useful, because it prevents the possibility of injury to the hand from the horse's teeth.

Mode of giving a drench.—A proper drenching-bottle should be provided. In its absence a soda water bottle will answer pretty well. The horse's head must be slightly elevated, and then the fluid should be poured down the throat very slowly. The head may, if necessary, be raised by means of a noose in the mouth, attached at its upper end to the prong of a stable fork. At the slightest sign of coughing the head must be released. Many drenches, it must be remembered, are of such a nature as to cause great irritation, if even a very small portion goes the wrong way.

A practice existed some years ago, and may perhaps continue even in the present day among farriers, of giving drenches through the nose. It is both injurious and dangerous, and should be strictly prohibited.

GOOD NURSING.—*Explanation of the term.*—Of primary importance in the treatment of disease is "good nursing." By good nursing we mean an intelligent appreciation of, and kind, prompt attention to the minuter wants and needs, whatever they may be, of the patient. These wants and needs will not only vary in each case, but they will often vary from hour to hour even in the same case.

Care and kindness, however, are not sufficient. All the care and kindness in the world, if through ignorance misdirected or misapplied, will not aid much in the restoration of health. It is impossible to lay down any exact rules for good nursing, but we hope to be able to give some general rules which, when applied according to the circumstances of each particular case, may be useful in the treatment of sick animals.

Loose boxes and quiet.—In most cases the first and most important point is to place the patient in a detached, cool, well ventilated, loose box in a quiet situation. The box should be fitted with a low half door, so that the animal may be able to lean his head over it. This is especially needed in all diseases connected with the respiratory passages.

It is essential that the half door should be low, because sick horses generally droop their heads, and are unable to raise them over high half doors. If the patient carries his head very low, the door should be opened altogether, and a bar placed across it. But in ordinary cases it is better to keep the lower half of the door closed, in order to prevent draught and chill about the legs.

In affections of the eyes and nervous system the box should be darkened, and as much isolated as possible from passing traffic.

In some few cases, such as those of wounds, when it is necessary that the horse should be tied up to prevent his biting the injured part, or in other cases where motion is not desirable, a stall will answer well enough; though even in these cases the cooler atmosphere of a detached box is preferable.

Draughts.—Whilst it is essential that there should be ventilation enough to insure purity of air in the box, it is also very important in most, but not in all, cases that no direct draught should come on the patient. As a general rule, sick and debilitated animals are far more susceptible of injury from such causes than horses in health.

In the premonitory and early stage of feverish or inflammatory attacks, the slightest draught appears to be most injurious, and may bring on a fit of shivering. The access or avoidance of an attack in this very early stage is often determined by care and attention on this point.

When, however, inflammation or fever has developed itself, the horse is no longer sensitive of draught; and provided he is well clothed, air may be admitted with the utmost freedom, even to the extent of a decided draught playing over the body.

When the crisis has subsided, the patient is again moderately, but not intensely as in the early stage, sensitive of draught. Much at this time must be left to the discretion of the attendant. If the animal seems refreshed by more air, he may safely be allowed to have it; but if, on the other hand, his coat begins to stare, we may be sure that the draught is doing harm.

The above observations, it will be seen, refer to draught, not to temperature. In all cases it is desirable that the temperature should be cool, decidedly cool, but it is not advisable that it should be positively cold.

Cleanliness, dryness, and sweetness of stable.—The box must be kept perfectly clean, dry, and sweet. The floor of the box should be kept as dry as possible. The practice of washing the floor is very objectionable, both because it makes the stable damp, and because it induces, or at least accelerates decomposition in the debris which always, to a certain extent, lodges between the interstices of the paving.

If there are underground drains, water should be poured down them daily, in order to keep them clear.

Warmth of the body.—The warmth of the body, and especially of the legs, must be maintained by warm clothing and bandages, increased or diminished according to the weather and requirements in each case.

Horses which are very weak, we may however remark, cannot bear heavy clothing. Neck and breast cloths, though not necessary or even desirable for horses in health, are sometimes needed for sick animals.

Friction may often be beneficially applied for the purpose of restoring warmth, especially in the legs. In some cases irritants, such as turpentine liniment, mustard, etc., may be required for the above purpose.

Clothing.—All clothing should be put on loosely. Not only is greater ease given, but more warmth is obtained from loose than tight clothing. The surcingle especially, if used at all, should be slack. Blankets tied loosely in front and under the belly are, however, preferable to clothing fastened by the surcingle, for sick animals, especially in diseases of the lungs and pleuræ, when the parts involved are liable to suffer from, or to be impeded in their free action by even the slightest pressure.

If it can be spared, a second suit of clothing should be kept in use; but in any case the clothing should be taken off and brushed twice daily. If the state of the patient renders him very sensitive of any chill, only a portion of the clothing should be removed at a time. In many cases, especially during the stage of recovery, the animal appears to be refreshed in a very marked degree by the admission of fresh air to the skin for two or three minutes at a time. Air, under such circumstances, no doubt acts as a tonic, and its effects may be compared to those of a shower bath on the human frame. With a similar view, under careful superintendence, a damp hay wisp may be run once or twice over the skin morning and evening.

Warm bandages.—Bandages intended to give warmth are made of flannel, and should be wrapped loosely round the legs. Tight bandages check the feeble circulation, and, moreover, the caloric passes more easily through them than through looser folds. It is believed, also, that there is a stratum of warm air between the folds which is very beneficial. With the view of producing or increasing this stratum, a little hay may be placed loosely round the legs before the bandages are applied.

Bandages should be about three yards long. The bandage should be rolled up before it is applied, and the winding on should be taken from the lowest part upwards. The bandages should be taken off two or three times a day, or oftener if the legs are cold, and some friction should be applied to restore warmth. When flannel bandages cannot be obtained, a fair substitute may be extemporized out of hay bands.

Cold bandages.—Cold bandages are usually made of linen, and must be kept constantly wet with water, and be applied with moderate pressure. A chamois leather bandage retains damp longer than any other.

Cold may be conveniently applied to the feet by putting them in a wet bran poultice, or by placing wet swabs round them and felt pads in the soles.

Sweating bandage.—A sweating bandage is made by covering a wet linen bandage with oil-skin. After it has been applied for some days, an ordinary cold bandage should be substituted for it, as it is apt to cause the skin to become scurfy. A sweating bandage has often a powerful effect in reducing enlargements.

Fomentations to be really useful should be continued for at least one or two hours at a time. The temperature of the water should not exceed 106°, or hardly as hot as the hand can comfortably bear. The temperature must be kept up to this point by the frequent addition of small quantities of hot water. The sponge or swab should not be allowed to touch the parts affected, but should be applied higher up, so that the water only may trickle down over the inflamed or injured surface. When the fomentation is discontinued, the parts should be loosely covered with flannel in order to obviate the risk of a chill. If flannel is not available, or the part is so situated that it cannot be conveniently applied, ammonia liniment, in cases where there is no abrasion of the skin, may be lightly rubbed on.

The leg below the knee may be conveniently fomented by putting it in a deep bucket of warm water. In all large establishments it is well worth while to get a bucket made half as deep again as usual for this especial purpose. The water in such cases may require to be put in after the horse's leg is in the bucket.

In most cases three or four fomentations in the course of the twenty-four hours are sufficient.

Cold bathing of the legs.—Cold water bathing of the legs is in many cases very beneficial. The cold gives tone to and braces up the structures which may have become weak or deficient in vital energy. The value of cold as a tonic has not been, we think, sufficiently appreciated in such cases. A good jet for this purpose may be made by attaching a gutta percha tube to the ordinary watercock.

Removal of the shoes.—In most cases of serious illness, especially where fever or inflammation are present, ease and comfort will be given to the patient by removal of all the shoes. Exception, however. occurs where horses have flat or pumice feet.

Water should always be within reach of the patient, especially in feverish or inflammatory attacks; and it is essential that it should be changed at least three times a day, or oftener in warm weather. A piece of rock salt, which the horse may lick as often as he likes, should also be

placed in the manger. Some medicines may be conveniently administered along with the water which the patient drinks.

Food suitable to the requirements of each case must be supplied. As the appetite of a sick horse is generally very slight and capricious, only small quantities should be offered at a time; and that which is not eaten should be removed after having remained a few minutes before the patient. Sick horses often prefer to feed off the ground.

A little grass or a carrot offered by the hand will often be taken, when a larger quantity put in the manger would be rejected. Sick horses very soon become tired of any particular food, and hence it is desirable to change their diet frequently. Cold bran mash, or warm, in catarrhal affections, good sweet hay sprinkled with salt and slightly wetted, grass, carrots cut lengthways to avoid the risk of choking, lucern, bruised oats, linseed tea, linseed boiled to a jelly and added to a bran mash, gruel and skim-milk, are each, for a time, generally palatable. Boiling water poured on slightly brown hay produces a tea, which is much relished by some animals; and in some diseases the steam arising from it, whilst the infusion is being made, acts beneficially in soothing the inflamed mucous membrane of the nose. Locks of hay after being so treated are also occasionally picked out and eaten. After gastric or bilious fever stale bread given by the hand will often be taken, when everything else is rejected. After a debilitating disease, skim-milk is very beneficial.

During the height of fever the appetite is completely lost; and food, even if taken, could not be digested. A liberal supply of water is grateful in such cases, and may be the means of introducing medicines suitable to the case. There is no use in attempting to force food on a sick horse until he shows some inclination for it.

When there is continued positive inability to swallow, some nutriment may be afforded by frequently giving oatmeal clysters in small quantities.

Linseed oil, at the rate of about two ounces in the course of the day, mixed in the food is often very useful in improving the condition of debilitated animals. The quantity may be gradually increased up to four ounces, if the patient appears to relish it. In cases of emaciation, glycerine at the rate of from four to eight ounces may be given daily.

Horses with free discharge from the nostrils.—A horse with a free discharge from the nostrils should, as a general rule, be fed from a temporary manger or bucket placed near the ground, as the depending position of the head whilst the animal is feeding, will facilitate the discharge. A wheelbarrow will serve very well as a make-shift for this purpose. But where the patient shows signs of head-ache, as is often the case, especially in feverish attacks, this position, which would determine more blood to

the head, is very undesirable. Steaming the head is very beneficial in catarrhal affections.

When a horse has a discharge of a suspicious character as to its nature, he should be tied up sufficiently to prevent his throwing it about all parts of the walls of the box.

Utensils to be kept clean.—Mangers, buckets, and all utensils used in a sick stable or box, should be kept scrupulously clean. Particular care should be taken that no sour bran mash be left in the corners of the manger. Hay on which the patient has been breathing should be thrown away, and not offered to him at another time.

Hand-rubbing, etc.—Gentle hand-rubbing of the skin, and also sponging of the nostrils and dock with weak vinegar and water, are generally refreshing to sick animals.

The sheath should always be carefully cleaned at the outset of any serious illness, and this operation should be repeated if the case is prolonged.

Beds.—A good bed is essential to comfort. Fresh, clean straw certainly looks nicest, and has undoubtedly the advantages of cleanliness and sweetness; but many practical men prefer a bed made of old litter collected from the dung-heap, but of course carefully cleaned and dried. It makes a softer, firmer, and more substantial bed; whilst on the other hand, the long, hard ends of the new straws, especially wheaten, are apt to irritate and annoy a weakly and sensitive patient.

Change of box and air.—If the animal's condition admits of his being moved, it is a good plan to shift him occasionally to a fresh box.

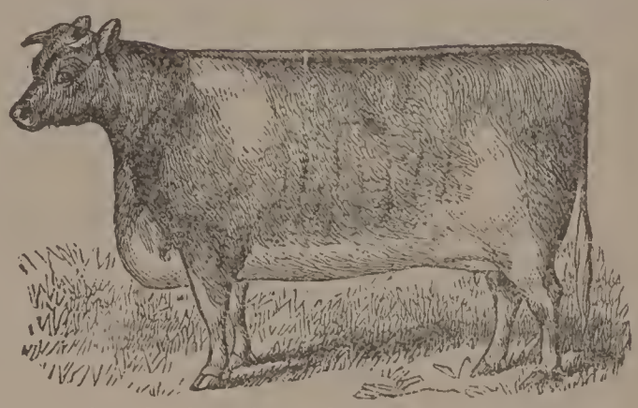
Though a box in a quiet situation is needed for a sick horse, yet as he recovers his strength, he should be moved during the day to a situation where he can see some of the traffic which may be passing by. A little such excitement acts as a stimulant and tonic to the system.

Apparatus for applying a stream of cold water.—A very convenient india-rubber apparatus is made for the purpose of bringing a constant stream or trickling of cold water on any part which may require such treatment; as, for instance, in some cases of sprains, or affections of the brain. The stream may be continued for about an hour at a time. After each application the part should be thoroughly dried and wrapped in a linen bandage. The cold application, under ordinary circumstances, may be repeated three times, but not oftener, during the day.

IMPORTED SHORTHORNS.

DIFFERENT BREEDS OF CATTLE.

THE SHORT-HORN.—The leading class in the cattle shows throughout the entire country will be, with very rare exceptions, the Short-horn. This is an English breed, originating in the valley of the Tees, and at one time called Teeswater cattle. They are also sometimes called Durhams, from the county in which they were extensively bred. They have long been famed for excellence as both beef and milk producers; but it must be confessed that the practices of modern breeders have been such as to seriously impair the reputation of the breed for the latter purpose. As a class, however, they are still good milkers, and for the production of good beef, under a system of liberal feeding, it is doubtful if they have any equals. They attain a greater size than any other breed, and with rich pasturage and high feeding mature very early, and make most excellent beef. In color they are all red, red with white spots, roan, or pure white. They have been more generally disseminated in this country and throughout the world than any other of the improved breeds.



THE HEREFORDS.—This breed has long contested for supremacy, as a beef-producing breed, with the Short-horns; and while there are few who will place them much below the Short-horns in this respect, there are some who do not hesitate to place them much above their Durham rivals. Certainly the quality of the beef produced by the Herefords is, at least, equal to that of the best Short-horn; but as to which is the better and more profitable beef animal for the average American farmer, we shall not attempt to decide. It is one of the points upon which much animated controversy has been and still is going on. No especial claim is made for the Hereford on the score of milking qualities, the advocates of the breed having been con-

tent to rest their claims solely on the merits of the Hereford as a beef producer. They take their name from the county of Hereford, in England. In size they are rather below the average Short-horn, and in color they are quite uniform, being red, with white faces, white bellies, and more or less white along the back. They have not been very generally disseminated in this country, although they were introduced as early as the Short-horns; but it cannot be denied that within the past three years they have made rapid strides in popular favor, especially with the ranchmen on our Western plains.

THE DEVONS.—This is also an English breed, and of all the breeds it is perhaps the oldest and the best established. They are uniformly of a deep, rich red color, with small heads, neat and rather long horns, round bodies, are fine in the bone, do not usually grow so large as the Short-horns or Herefords, and are famed the world over for hardiness. The steers are unequalled as work cattle, the cows are usually fair milkers; and when quality, quantity, and cost of production are all considered, their advocates claim for them superiority over all other breeds in the production of beef, and that they will live and do well where the Short-horn and Hereford would starve. They have not been widely disseminated in this country, but there are several most excellent herds. No breed of cattle in the world presents a more attractive appearance than a herd of well-kept Devons, with their rich red color, neat, waxy horns, expressive eyes, and sprightly movements.

THE AYRSHIRES.—This is one of the recognized dairy breeds, and comes to us from Scotland. The specialty of the Ayrshire is that of a milk-producer, for the manufacture of cheese, and the supply of cities with the lacteal fluid. The milk of the Ayrshire is not especially rich in cream, but in all the other essentials that go to make up good milk, it is equal to the best; and the breeders of Ayrshires claim that the quantity produced by their favorites is greater than that produced by any other breed. They are of fair size, and possess moderate beef-producing qualities. In color they are not very uniform, but red-and-white, brown-and-white, and black-and-white

predominate. Small red, black, or brown spots, on a white ground, is perhaps a more uniform marking than any other, although in many cases the red predominates. The cows usually have small heads and horns, light necks and shoulders, deep flanks, and heavy hindquarters, with all the marks of deep milkers.

THE HOLSTEINS.—This is also a dairy breed, larger and coarser than the Ayrshires; and while it is claimed for them that they are superior to the Ayrshires as deep milkers, it is also claimed that they are better adapted to the production of beef, and hence a better cow for either the dairyman or the general farmer. Those imported to this country have generally been quite uniform in color—black-and-white spotted, or "listed"—but there is a difference of opinion upon the color question, some writers claiming that they are of all colors. They are rather coarse and bony in appearance, are large, strong growers, and are unquestionably deep milkers. They come from North Holland, and it is claimed by some writers that this breed translated to the North of England, formed the basis for the more modern Shorthorn. As dairy cattle they undoubtedly possess great merit.

THE CHANNEL ISLANDS CATTLE—*Jerseys, Guernseys, and Alderneys.*—The Channel Islands,—Jersey, Guernsey, and Alderney,—situated in the English Channel between Great Britain and France, have a race of cattle that have attained great popularity among dairymen, mainly on account of the quality of the milk, which is especially rich in cream. Of these Channel Islands cattle, the Jersey is considered the typical race—at least it has attained the greatest popularity, and has been most widely disseminated—but they all show unmistakable traces of a common origin. When first introduced into this country they were all called Alderneys, no matter whether from Guernsey, Jersey, or Alderney; but as the cattle of each island are kept distinct, and no crossing between them is permitted, we have ceased to give them this general appellation, although the difference between the Alderneys and the Jerseys is so slight as not to be worth mentioning. They are famed for the large percentage of cream which the milk affords, and for its rich, golden color; and are especially desirable as family cows to furnish cream and butter for table use.

The Jerseys are the most numerous, as Jersey is much the largest island of the group—larger, indeed, than all the others combined. The Guernsey cattle are larger, and perhaps coarser than the Jerseys; and it

is claimed that while they are equally as desirable as the latter with regard to the quantity and quality of the cream and milk, they fatten off more readily, and are more valuable for beef. On this account, it is urged that they are better than the cattle of Jersey and Alderney for the general farmer, for dairy purposes, or for crossing upon other stock. On the other hand, the breeders of Jersey cattle claim superiority for this breed over all others in the quality of the milk and cream, and in the purity of the breed. The cattle of Alderney are, as a class, said to be smaller and more delicate than those of Jersey and Guernsey.

The Jerseys are the only Channel Islands cattle that will make much show at the fairs. They are small animals, with beautiful, deer-like heads. In color they are silver-gray, light or dark fawn, light or dark brown, pale red, with more or less markings of white sometimes occurring with all the above colors; but a "solid" color, with black nose, tongue, and switch, are considered desirable.

POLLED ANGUS, OR ABERDEENS.—This is a Scotch breed that has rapidly grown in public favor during the past five years, and quite a number of them have been imported to this country, where they have given great satisfaction so far as tested. As the name indicates, they are black and without horns. As a beef-producing breed they are rapidly growing in popularity, and we anticipate considerable importations from Scotland to the United States in coming years, notwithstanding the restrictions with which the traffic is surrounded.

OTHER BREEDS, such as Galloways, West Highlanders, Swiss cattle, etc., may be found occasionally in our show-yards, but they are so rare that a description of them will scarcely be necessary.

SCALE OF POINTS FOR COWS.

ADOPTED BY THE AMERICAN JERSEY CATTLE CLUB APRIL 21, 1875.

POINTS.	COUNTS.
1. Head small, lean, and rather long	2
2. Face dished, broad between the eyes and narrow between the horns	1
3. Muzzle dark, and encircled by a light color	1
4. Eyes full and placid	1
5. Horns small, crumpled, and amber color	3
6. Ears small and thin	1
7. Neck straight, thin, rather long, with clean throat, and not heavy at the shoulders	4
8. Shoulders sloping and lean; withers thin; breast neither deficient nor beefy	3
9. Back level to the setting of tail, and broad across the loin	4
10. Barrel-hooped, broad and deep at the flank	8
11. Hips wide apart and fine in bone; rump long and broad	4
12. Thighs long, thin, and wide apart; with legs standing square, and not to cross in walking	4
13. Legs short, small below the knees, with small hoofs	3
14. Tail fine, reaching the hocks, with good switch	3
15. Hide thin and mellow, with fine soft hair	4
16. Color of hide, when the hair is white on udder and inside of ears, yellow	5
17. Fore udder full in form, and running well forward	8
18. Hind udder full in form, and well up behind	8
19. Under udder free from long hair, and not fleshy	5
20. Teats rather large, wide apart, and squarely placed	6
21. Milk veins prominent	5
22. Escutcheon high and broad, and full on thighs	8
23. Disposition quiet and good-natured	3
24. General appearance rather bony than fleshy	6
Perfection	100

In judging heifers, omit Nos. 17, 18, and 21.

The same Scale of Points shall be used in judging bulls, omitting Nos. 17, 18, 19, 20, and 21, and making due allowance for masculinity.

MANAGEMENT OF CALVES.—Food produces animal growth, and the more rapidly that growth is produced the greater the profit. The old time Western cattle-raiser provided most completely for calves by having them run with the dams and take the whole product of milk. This was a liberal provision, but is considered quite too expensive in a region where the milk can be utilized for dairy products, as it will yield in butter or cheese as much as the whole value of the calf at the end of the season. This has caused, in all the well-settled States, an abandonment of the system of letting the calf run with the cow, except in the case of a few breeders of thorough-breds, who still adhere to the practice. There is other food much cheaper for a calf than new milk, after it is a few weeks old. The skimmed milk is well utilized in feeding to calves, and, when given with other food containing considerable oil, will make a growth quite as rapid as whole milk. One pound of boiled flaxseed, mixed with the skimmed milk for each calf, will cause a growth entirely satisfactory. This flaxseed will cost, in most localities, about 2½ cents, while the cream thus saved for butter will bring from 10 to 20 cents—a saving of from three to seven times the cost of the flaxseed. But as most farmers are loth to take the trouble of boiling flaxseed, they may use, with the skimmed milk, linseed oil meal, or the new process linseed meal instead. The latter does not supply much oil, but it is so rich in muscle-forming food, and phosphate of lime for growing the bones, that very strong and finely formed calves may be grown. The linseed meal may be purchased for one cent per pound, in ton lots; and two pounds of this added to skim-milk will produce a most vigorous growth.

This refuse of our oil mills should all be used in this country to grow young animals, which would make our exports from this source at least $20,000,000, instead of $4,000,000 to $5,000,000 now received from oil-cakes. It is a prodigious folly to export this raw material to make meat, instead of the meat it would grow. This highly nitrogenous food is precisely adapted to growing calves and young stock, and then our great corn crop is exactly adapted to fattening these cattle after their frames are grown. Corn is now the great fattening food of the world, but it has too large a proportion of starch for growing young animals.

Our cattle feeders are becoming better acquainted with the use of oil-cake, and are making more home use of it in feeding young cattle. If they could be induced to feed it all at home, it would have a great influence in raising the quality of our beef and mutton for export.

Calves, while fed upon new milk, get into a very thrifty condition, and this thrift is easily continued by the use of other food when that is discontinued. In the first place the calf-lot should be well provided with water, and then, near the watering place, if this is convenient,

there should be a trough or troughs for extra feed. This extra feed may be of various kinds, according to the productions of the farm. If the farm raises oats, one to two quarts of oats to each calf, given in two feeds, per day, will do much towards keeping the calves growing finely; or two quarts of bran and one and one-half pounds of linseed-meal, given in two feeds, or two pounds of corn-meal with the oil-meal. This extra feed, after the calves cease to get milk, will continue their rapid growth.

It is only from extra food that any growth can be made. If the calf only gets food enough to support its present condition it must remain without growth, and the food it eats is wholly lost; and perhaps worse than lost, for the calf cannot remain stationary without becoming unthrifty, and this unthrifty condition will greatly interfere with its future growth. Every consideration, therefore, requires that calves should not be permitted to remain stationary, but should keep up a steady, thrifty growth throughout the season. That is what some skilful, practical feeders mean when they say that calves should never be permitted to lose their calf-flesh; and if this can be prevented they will continue to make a profitable growth till fitted for market. There is no feed given to a calf during his whole life that will pay a better profit than this extra food we have advised to be given during the first season. The feeder cannot afford to be illiberal in feeding his calves—his only profit depends upon his liberality.

EFFECT OF FOOD ON COMPOSITION OF MILK.—This subject has occupied a good deal of attention among intelligent dairymen, since the first publication of Dr. Krum's experiment, some ten years ago. Then it was stated that the relative proportion of the constituents of the milk could not be changed by a change of ration; that the proportion of fat to casein in milk was quite constant, notwithstanding any change in the ration. It was said that the proportion of the constituents of milk varied in different cows, but that the food had little, if anything, to do with these proportions. Now such a conclusion was quite opposed to the general practical observation of dairy-men, as well as opposed to the nature of the case. As the cow operates simply as a machine in making milk out of food, what an inference to draw—that the composition of the food had nothing to do in determining the composition of the milk produced from it!

We recur to this subject at this time to notice an excellent condensed statement of it by Prof. G. C. Caldwell, of Cornell University, in the first annual report of the Cornell University experiment station, for a copy of which we are indebted to the professor, who is the director of the station. This report contains many interesting experiments, to which we shall hereafter refer.

Prof. Caldwell, in noting the experiments made in this matter of the effect of food on the composition of milk, mentions those of Bousingault, made in 1838 and 1858. In the case of one cow, for 100 parts of casein, the fat ranged from 85 to 127; and of another cow, from 83 to 187 parts; with one cow the smallest proportion of fat was yielded on wheat flour fed with hay, and the largest on hay alone; with the other, the smallest proportion of fat was produced when the cow was fed on molasses and hay, and the largest on green clover. Playfair found a great difference in the proportions of fat and casein between the morning's and night's milk; in the morning, 69 of fat to 100 of casein, and at evening, 144 of fat—the cow being fed on grass; but when the cow was fed on potatoes and hay, there was very little difference in the ratio of fat to casein from morning's or night's milk. Kannrodt found, in the case of one cow, the same change in the proportion of fat to casein between morning's and night's milk. The morning's milk contained 79, and the night's milk 128 of fat to 100 of casein.

Rhode & Frommer experimented with four cows, and different rations, and the proportions were found as follows:

Feed added to Hay.	*Fat to 100 casein.*
Nothing	74
Potatoes	88
Potato mash	62
Sugar beet mash	108
Sugar beets	100
Carrots	88
Rye mash	99

The following experiment of Stohmann with two goats, from April to September, on various rations, shows how the ratio of fat to casein varies, and also the steady increase of the proportion of casein, the longer lactation continues:

Feed added to the hay ration.	Goat No. 1.		Goat No. 2.		Fat to 100 casein.	
	Percentage of fat.	Percentage of casein.	Percentage of fat.	Percentage of casein.	No. 1.	No. 2.
Nothing	3.8	2.4	3.0	2.8	158	107
Starch	3.4	2.5	2.5	3.0	136	83
Oil	4.0	2.8	3.2	3.1	143	101
Nothing	5.2	3.1	3.6	3.3	168	109
Sugar	4.6	3.3	2.5	3.5	139	71
Nothing	5.6	3.7	3.9	3.7	151	106

Prof. Caldwell remarks on this, that "the change in this ratio of fat to casein is dependent, to some extent at least, on the character of the fodder, since it takes place alike in both animals with the changes of ration,"

Let us also call attention to the peculiar fact, that when the change is made from oil to nothing, and from sugar to nothing, the proportion of far increases in both animals; and when the change is made from nothing to sugar, the oil is decreased. Now, we might expect, when oil is added to the hay ration, it would increase the fat; also, that sugar would do the same; and we think this table, properly explained, confirms that view. The time of each ration is too short, and the effect of it goes into the next ration or period. While oil is added to the ration of hay, the system of the animal is only gradually affected, and the time being too short, the effect only begins to show prominently after the oil ration ceases. It takes about one week for a new ration to be fully assimilated by a ruminating animal, and these rations were continued only for some two weeks; therefore, the effect of the ration is seen in the next period, when nothing is fed. In most of the experiments there has not been a sufficient study of the physiology of the animal—the time has been too short to determine the effect of the food.

The Professor gives a short reference to the experiments of Kuhn and his assistants, and thinks the evidence very strong that it is not practicable to attempt to change the proportion of the fat to the casein; but in this, we think, he allows partial experiments to over-ride first principles. Yet in summing up the brief history, Prof. Caldwell says: "They [the experiments] show that this proportion [the proportion of fat to casein] differs widely in the milk of different cows; that it is not constant for the milk of the same cow; that certain articles of fodder may cause an increase in the proportion of fat, and not of casein, and so cause a change in the ratio of the one to the other; and, also, that the individuality of the cow may modify the influence of the fodder on the composition of the milk."

Experiments at Cornell.—Prof. Caldwell also gives some interesting experiments on this question, made at the Cornell experimental farm. To eliminate the effect of individuality, he takes four cows, in the winter of 1875–6. The milk is all mingled together, and a sample taken each day of the second week of the experiment with each ration, and an average of all the samples of the week is obtained. The following table shows the ratio of fat to casein:

	Ratio of Fat to Albuminoids.
First ration	111
Second ration	121
Third ration	126
Fourth ration	137
Fifth ration	124
Sixth ration	121
Seventh ration	118
Eighth ration	100

In experiments of 1878–9, three cows were taken. The grain was a mixture of one-half bran, one-fourth oats, and one-fourth corn-meal. The milk of the three cows was mixed as before, and a sample of the morning and evening milk taken. Each ration was continued for a fortnight. The following tables show the ration, the total amount of milk, the percentage of fat and albuminoids, and the parts of fat to 100 of albuminoids:

No. of Experiment.	*Grain.*	*Roots.*	*Hay.*
I	8 lbs.	14 lbs.	15.5 lbs.
II	16 "	14 "	12.0 "
III	8 "	14 "	15.0 "
IV	4 "	14 "	17.3 "
V	0 "	0 "	19.0 "
VI	8 "	0 "	13.5 "
VII	16 "	0 "	10.0 "
VIII	0 "	0 "	Grass *ad lib.*
IX	4 "	0 "	Grass *ad lib.*

No. of Experiment.	*Total milk, pounds.*	*Percentage of fat.*	*Percentage of Albuminoids.*	*Fat to 100 of Albuminoids.*
I	696	3.71	5.50	67.5
II	737	3.68	4.00	92.0
III	671	——	——	110.0
IV	640	3.52	3.13	113.0
V	568	3.67	3.41	108.0
VI	644	3.14	3.22	97.4
VII	700	3.25	3.88	83.9
VIII	709	3.69	4.59	80.2
IX	700	3.46	4.48	71.0

This last experiment has much interest, showing a greater uniformity in the element of fat than in casein. The separate statement of the percentage of fat and albuminoids enables us to see what causes the great change in the ratio of fat to casein. It appears that the variation in

the fat of the milk for the whole period of eighteen weeks was only .57 (57-100) per cent., while the variation in albuminoids was 2.37 per cent., or more than four times as great. This separate statement of the fat and the casein, or albuminoids is very important, as it enables us to study the specific effect of the food more closely; and it is to be regretted that all the previous statements do not show this. The average of fat during the experiment is 3.51 per cent., and of casein 4.08 per cent.

When we take the two goats in Stohmann's experiments, we find the greater variation in fat—the first goat, 2.2 per cent., and the second, 1.4—while the greatest variation in casein is—first goat, 1.3 per cent., second goat, .9 (9-10) per cent.

MANAGEMENT OF COWS.—Too many dairymen are careless about full feeding their herds in the busy time of harvest; yet this is, perhaps, the most trying time of the season. The farmer is extremely busy, and forgets to inspect his pastures, and see that there is sufficient food to keep his cows in condition and to produce a full yield of milk. He often says: "I fear my pastures are getting too short for my cows, but I hope that we shall soon have rains that will give fresh feed, and then my cows will come up again." But this is a mistaken opinion, which he seldom takes the trouble fully to investigate. Milk is a temporary product, and naturally grows less as the time advances from calving, and when there is a falling off it can seldom be recovered; so that when a cow falls off five or ten pounds in her milk, it means the loss of about that amount every day in the remainder of the season. This is a very serious matter, and does not admit of delay for propitious rains. Before they come and cause the grass to grow, your herd of cows have lost one-fourth to one-third of their usefulness for the rest of the season. Let the dairyman, then, look to his herd in time, and see that the wants of each cow are provided for. A dairyman should study the peculiarities of each cow. Some cows will appropriate all the extra food they can digest to the secretion of milk, and even deplete their own systems to keep up a full flow of milk. Such cows should be especially well provided for—their generosity should be reciprocated. These are the cows that pay for feeding. They pay back the principal with a large percentage of interest on all the extra food given them. They are only good cows that will pay for extra feeding—in fact, they are only good cows that will pay for feeding at all. And a dairyman may rest assured that a cow that will not respond to liberal feeding by an equal increase of milk is not worth keeping, and instead of adding to his income, runs him in debt every year. If he has carefully noted the comparative yield of milk by each of his cows, he should feed them in proportion to their yield. From long practice,

we have found no failure of good cows to respond to extra feeding in late summer. We have often given debit and credit to the cows on extra feed, and always found the credit ahead. When the feed begins to grow scanty in July, commence by feeding one-half pound of linseed meal, and one pound of bran to each cow per day. The linseed costs 1¼ cents, and the bran ¾ cents, making a cost of 2 cents per day. This small allowance will keep up the full flow at the beginning of the deficit of grass. If the pasture should become still shorter, double the allowance, and still the extra milk will pay all. We have often, also, mentioned the fact that the fertilizer left by this rich food is worth a large part of the cost of the extra feeding.

Of course, if the dairyman has green clover, fodder corn, millet, peas, and oats, etc., to feed his herd night and morning, in stall, he may dispense with the other food; but as there are so few dairymen who have fully provided these green foods, the great body of them must resort to grain foods. The various oil-cakes should always be used in part when food must be purchased, for they have an excellent effect upon the cows as well as the product.

Apoplexy is caused by a rush of blood to the head. Well-conditioned animals are usually the ones to suffer from this disease. They appear sleepy and dull, eyes staring, breathing quick. If the animal is bled in the first stage of the disease, and a dose of Epsom salts given, it may be possible to save it. If not attended to at once the animal soon falls and dies.

Cow-pox.—The teats of cows are subject to two diseases very similar in appearance. In the genuine cow-pox, the vesicles contain a purulent matter, and are surrounded by a deep blue circle, more or less inflamed. If not attended to they break and run, forming ulcers that are difficult to cure. It is a well-known fact that the milker's hands often become inflamed, having fever, pustules appearing at the joints, and if neglected, ulcers will form that will prove troublesome. Persons attacked with cow-pox are exempt from small-pox.

Wash the teats frequently with warm water and castile soap and wipe them dry; apply the following lotion twice a day: One ounce sal ammoniac, four ounces camphorated spirits of wine, one pint wine vinegar, two ounces Goulard's Extract; mix and keep in a closely corked bottle for use. "Sore teats" sometimes resembles cow-pox very closely, but the vesicles are smaller, not so round nor deep, and are void of the blue color: to such apply equal parts of lime water and linseed oil.

Diarrhœa is produced by various causes, and cattle are more or less subject to it in the spring of the year. Calves are more liable to be

attacked by this disease than older cattle. The nature of this ailment is too well known to need a description here. Nature, in many cases, will effect a cure without the aid of man. If, however, the animal exhibits signs of pain, refuses to eat, passes blood, and looses flesh, the farmer should at once give a dose of Epsom salts, and repeat it again before the day is over. If in twenty-four hours the animal is no better, administer the following astringent, mixed in a quart of gruel: Prepared chalk, two ounces; oak bark, powered, one ounce; opium, powdered, two scruples; catechu, powdered, one-half ounce; powdered ginger, two drachms.

Diarrhœa should not be confounded with dysentery. The former is characterized by a too free discharge of dung, and in too fluid a condition; while in the latter, the discharge is not rapid, and is accompanied by a peculiar straining. The dung is offensive, and is often charged with blood.

Dysentery.—This is one of the most dangerous diseases cattle are subject to. It is often mistaken for diarrhœa, but can be easily distinguished by closely observing the following symptoms: The efforts to expel the dung are frequent and accompanied by evident pain; the animal is restless, frequently lying down and rising again. If the loins are pressed with the hand, the animal will shrink. The discharge will be thin, and have an offensive smell.

Give the following drink first: Dissolve a pound of Epsom salts, and one-half an ounce of carraway seed, powdered, in a quart of warm water and corn-meal. This will cleanse the bowels and prepare them for the proper medicine. Twenty-four hours after this, give the following: Ten drops of Fleming's tincture of aconite, three times a day for several days. Bleeding is sometimes beneficial.

Fardel, or clue bound, are terms used to designate costiveness in cattle. The dung becomes hard and tenacious, and is voided in very small quantities. The mouth appears hot and dry, the countenance assumes a haggard appearance, and the eyes appear wild. The symptoms are very active and highly dangerous, and require prompt attention. Give a strong dose of Epsom salts, dissolved in rain water. The animal should also be bled, to reduce fever.

Foot-rot.—This disease appears in the foot between the claws, and sometimes extends up the leg, making the animal very lame. It is often communicated to a whole drove of cattle. Wash the foot clean with castile soap and rain water. Make a mixture of one pound of simple cerate and four ounces of red precipitate, and rub well into the sores. Common lard will answer instead of cerate.

GARGET.—This disease makes its appearance in the udder of the cow. It usually attacks beasts in high condition, and at the time of calving. The udder becomes swollen, hard, knotted and painful; the milk congeals, and the flow is partially stopped. If the cow has a calf, it should suck the dam at once. Feed the cow sparingly. Wash the udder with warm water, and dry carefully; then rub the entire surface with the following: A pound of melted lard and one ounce of mercurial ointment, mixed and applied as hot as the animal will bear.

HORNS.—*How to tell age by.*—The outside surface of a calf's horn usually remains smooth until the animal is about two years old, when a rough circle begins to form at the base of the horn, and is completed in about a year, when another commences, and requires about the same time to be completed. So that the age of a *cow* can be usually ascertained by adding two to the number of rings. These are not always distinct, and are susceptible of being tampered with by filing.

Hollow-horn is a disease of such rare occurence that it needs but a passing notice in these columns. The symptoms are a discharge of white or light yellow matter from the nostrils; the animal appears dull, with hanging head and closed eyes; the horn is hot at the base. The treatment consists in giving the animal complete rest. The nostrils should be steamed with hot-water vapor. Apply cold, wet cloths to the head. The cavity between the eyes should be opened and syringed out with the following preparation: Powdered oak bark, one-half ounce; catechu, powdered, two drachms; opium, powdered, one-half scruple. Mix the whole in a pint of luke-warm water. In severe cases it is better to call in the veterinary surgeon.

HOOVE, or BLOWN, is so common and well known that a description of it here is hardly necessary. It is caused by over-feeding, usually upon luxuriant and wet pasture, causing a fermentation to take place in the paunch, resulting in the stomach being filled with gas; the animal swells sometimes to an enormous extent. Medicine is almost useless, as the entrance to the paunch is effectually closed. If the case is not too obstinate, give the animal an ounce of spirits of hartshorn in a small quantity of water. If the life of the animal is threatened, the lancet must be used and the paunch punctured; the incision should be made about midway between the last rib and the prominent point of the haunch bone. The gas will escape through the vent, and the animal will be relieved at once. The wound will heal in a few days.

LICE.—These appear upon the animal only when it has been neglected. It will spread rapidly among cattle on a farm. The recipe given for "mange" will effectually destroy them; or, wash the skin night and

morning with a decoction of two ounces of lobelia seeds in one quart of boiling water. After standing two hours, apply with a sponge.

MANGE in animals corresponds to the itch of the human family. It is produced by a parasitic insect or *acarus*, but of a different species to that causing itch, being much larger. The trouble in treating this disease arises from its contagious character. When you have the animal partially cured and free from *acari*, it is liable to rub against some post or tree against which it has been previously rubbing, when the insects which were left upon them are again brought in contact with the body, and the disease is reproduced. The animal should be cleansed thoroughly with warm water and castile soap, and removed to different quarters. Rub the sores well with the following ointment: One-half pound of powdered sulphur; one-half ounce of white hellebore; one ounce mercurial ointment; one pound lard; well mixed.

MILK FEVER.—Place the cow in a cool, shaded place, or roomy box-stall or shed, well bedded. Give a purgative consisting of a pound and a half of Epsom salts dissolved in a quart of warm water; add thereto a pint of molasses and two ounces of ground ginger. Follow this up every half hour with stimulants—such as half an ounce of aromatic spirits of ammonia, and one ounce each of tincture of ginger and sweet spirits of nitre, given in a pint of cold water or linseed tea. Apply rags to the head constantly, wetted with cold water, or a bag loosely filled with chopped ice. Apply strong hartshorn liniment or fluid blister along the spine, and friction with equal parts of alcohol and water to the limbs. Keep the udder constantly free from milk. In the case of much bloating, insert a trocar in the left flank. Give frequent injections of blood-warm soap suds. On recovery, give tonic medicines,—such as a scruple of nux vomica, one dram of powdered gentian root, in a pint of thin gruel or linseed tea, twice or thrice daily during a week.

MURRAIN.—This is a dangerous disease, but not of frequent occurrence in this country. The disease seems to attack the entire system of the animal at the same time. The symtoms are fever, quick pulse, cold horns, swollen eyes, sometimes accompanied by diarrhœa. The first thing to be done is to separate the sick from the well, as this disease is very contagious. First, bleed the animal freely; then administer a purgative drink—a quarter of a pound of Epsom salts dissolved in soft water—twice a day for several days. If tumors appear upon the body or teats, wash with the following solution: Four drachms of sulphate of zinc to a quart of rain water. Everything depends upon good nursing.

RED WATER.—This disease derives its name from the red, or dark color of the urine. It is a common complaint among cattle, and one

difficult of management. The cause is, almost invariably, feeding on damp and ill-drained pasturage. The symptoms are, first, purging, followed by constipation; the animal appears to be in great pain, moaning; ceases to ruminate, and strains in passing urine, and is feverish. The pasture should be changed at once, and the animal given a dry range. Bleeding is often necessary, but must be practised with moderation. Dissolve in a point of boiling water half a pound of Epsom salts and a quarter pound of ginger, and give as a purgative. Another remedy is to give a pint of linseed oil, using clysters of soap suds.

THE DAIRY.—Pure, cool water is essential to all domestic animals, but more especially to milk cows. If you want pure butter, give pure food and drink.

Glazed earthenware milk-pans, holding about six quarts, and with a half-inch rim, projecting around the top, are used with satisfaction in some of the dairy districts of Ohio.

How to get a full milk pail.—We assume that the cow is properly fed. Lacking this condition, no cow can milk as she ought. But careful feeding seems to have but little influence on the milking properties of some cows; they lay on flesh instead. Yet, as they have first of all to live before they can think of giving much milk, or in fact any milk at all worth speaking of, and as about two-thirds of the food they have an appetite for goes to sustain the offices of life, it is clear that underfeeding will not lead to a profit. This is a proposition well enough established, and appeals alike to our judgment and interest. Yet, after all, breed is of the first importance, because without it good feeding is of small effect on the milk pail; but if we have both breed and feed, the pail will overflow—if we let it. Breed, then, is first; food next; then good milking by hand, kind treatment, shelter from the storm, etc.

Points of a good cow.—A gentleman, said to have great experience in buying and handling stock, gives the following outlines of a good cow: "In the first place, will say that I believe in the Guenon escutcheon, but still I think it needs a good deal of studying to understand it. I see a great many think if it happens to be rather wide it is No. 1. But I have seen very poor cows on which the escutcheon was both high and wide, but still it was broken and badly shaped. We will commence at the head. The muzzle should be rather large, but the head small and bony, with the face dished and wide between the eyes; horns rather small and amber colored; ears small, thin, and yellow; neck thin and long, with clean throat; neck will drop a little in front of shoulders, making what I call a ewe neck; shoulders sloping—not heavy, but lean or bony; back level, with good width of hips. The back-bone should

be rough or loose jointed. I consider this one of the best points. As you move your hand along the back the joints seem to be further apart and open. Barrel broad and deep at the flank, with the back ribs wide apart. Rump long and rather wide; thighs long, thin, and wide apart, with legs short and bone fine; hoofs rather long, but small; milk veins large, and where they enter the body you can stick your fingers in; udder well forward and well up behind, with four good large teats set square and wide apart. Udder soft and pliable and not fleshy, so that when the milk is drawn the udder is nearly gone. Tail long and slim, with a good switch. Skin should be soft and yellow, with a good escutcheon and mild disposition. The cow filling the above description, or nearly so, I have always found a good one.

MISTAKES IN MILKING.—"We have frequent communications," says the *American Cultivator*, "from our subscribers concerning the fact of their cows giving bloody milk. No one would be surprised at cows giving bloody milk if they were aware of what a network of blood vessels the udder of a cow is composed. No person should ever make an attempt to milk a cow till they have obtained some knowledge of its structure; then we perhaps should dispense with a large number of those double-fisted men who do not seem to have any knowledge of the purposes or anatomy of a cow's bag, except for them to squeeze and drag it as though it were a piece of dead hide. There is no objection to the strong-handed man as a milker, the stronger the better, but it should be accompanied with a touch as delicate as a woman's. Whenever the cow manifests the slightest sensitiveness, the udder should be thoroughly examined. Milking is a pleasure to the cow when everything is all right, and whenever it ceases to afford gratification to the cow there is evidently something wrong. Never fail to wash with warm water the bag of a young heifer, both before and after milking."

MEDICINAL QUALITIES OF BUTTERMILK.—For a summer beverage there can be nothing more healthy and strengthening than buttermilk. It is excellent for weak or delicate stomachs, and far better as a dinner drink than coffee, tea, or water, and unlike them, does not retard, but rather aids digestion. A celebrated physician once said that if every one knew the value of buttermilk as a drink, it would be more freely partaken of by persons who drink so excessively of other beverages; and further compared its effects upon the system to the cleaning out of a cook-stove that has been clogged up with ashes that have sifted through, filling up every crevice and crack, saying that the human system is like the stove, and collects and gathers refuse matter that can in no way be exterminated from the system so effectually as by drinking buttermilk.

It is also a specific remedy for indigestion, soothes and quiets the nerves, and is very somnolent to those who are troubled with sleeplessness. There is something strange in the fact that persons who are fond of buttermilk never tire of singing its praises, while those who are not fond of it never weary of wondering how some people can drink it. So far as possible, people should overcome their aversion to it, and learn to drink it for health's sake. One gentleman of our acquaintance is so extremely fond of it that we knew him one time to drink about three glasses, then set his glass down with a thud, exclaiming earnestly as he smacked his lips: "That's food and raiment both." While another buttermilk enthusiast made the statement once that where the liver has become lifeless from torpidity and inaction, and is too dead to perform its functions, buttermilk will cause a new one to grow in. Whatever exaggerated statements may have been made concerning buttermilk, its medical properties cannot be overrated, and it should be more freely used by all who can get it. Every one who values good health should drink buttermilk every day in warm weather, and let tea, coffee, and water alone. For the benefit of those who are not already aware of it, I may add that in the churning the first process of digestion is gone through, making it one of the easiest and quickest of all things to digest. It makes gastric juice, and contains properties that readily assimilate with it, with little or no wear upon the digestive organs.

TIMOTHY FOR DAIRY MEADOWS.—One of our principal meadow grasses is timothy, and this forms a tuber or bulb just above the surface of the ground, and is injured or destroyed when this bulb is cut or eaten off. Pasturing meadows of this grass is likely greatly to injure these bulbs, and this explains the serious injury that occurs when these meadows are pastured in the fall. Cutting too close with mowing machines often injures it. Timothy is, perhaps, our most valuable meadow grass, as, with proper attention, it will easily continue ten years in succession to yield large crops. If our meadows consisted of Kentucky blue grass, wire grass, orchard grass, red top, etc., pasturing would not be so fatal, although then not advisable except on alluvial or overflowed land. But let us see what the real value of the aftermath of timothy meadow is worth. Take the case mentioned of seventy-five acres pastured. Four cents' worth of wheat middlings and corn-meal per day to each cow would have produced more milk and left the cows in better condition during the five or six weeks that they were allowed to run a portion of the day upon the meadows. This would have cost, at the most, only about one dollar and sixty cents per head, whilst the damage to the meadows was at least ten times as much. Meadows require generous attention, should be top-

dressed with stable manure in the fall, instead of pasturing them, and when this cannot be had should be top-dressed with some commercial fertilizer every few years, and thus kept in full production, aud your dairy full fed through the winter.

If corn grown for soiling is left until it becomes hard and yellow before it is fed to the cows, the milk product will fall off considerably. Fodder for soiling should be young and fresh, and not past the flowering. It is in its best state when the ears are beginning to form. When it is hard and dry it should be cut and cured.

A cement floor is not the best for a dairy, as it absorbs the drippings of milk, and becomes foul in a short time. A good floor is of matched plank, with tight joints and painted, so that it will absorb no moisture. Whatever drippings fall from the churn may be washed off such a floor without leaving any traces. Brick is quite as absorbent as cement. A flagstone floor, with close joints set in cement, is the best of all.

A classification of the different breeds of cattle may be made in a general way as follows: If butter dairying is the object, Jerseys and Short-horns; if it be cheese, Ayrshires, Short-horns, and Holsteins; if beef, Herefords, Short-horns, polled Angus, Holsteins, and Devons; if working oxen, Herefords, Short-horns, Devons, Holsteins, and polled Angus. There are families of excellent milkers in all the breeds we have named, but we have classified them according to their reputation.

Cows that are forced by the spareness of the pasture to feed in swamps, and more especially in hot, dry weather, may be expected to suffer from malaria and blood-poisoning. This may appear by sores on different parts of the body—about the feet, the shoulders, loins, and lips and nose. The remedy is to keep them out of the swamps, and feed them on hay and a little meal or green-corn fodder; to give a quart of olive-oil, and after that has operated, to give, daily, in the morning, one ounce of saltpetre, and in the evening, two drachms each of chlorate of potash and powdered gentian root. The sores may be washed with a solution of one drachm of chloride of zinc in a quart of water.

VARIOUS BREEDS OF SHEEP.

LONG WOOLS.—The present type of long-woolled sheep are of English origin. Each generation of them for the past hundred years has shown some points of superiority over their ancestry. They are more nearly an artificial animal than either of the other breeds, lay on fat readily, and are susceptible of being brought into very high condition.

THE COTSWOLD is the best known in the United States, and is a favorite with the majority of long-wool breeders. The better types are admirable physical specimens, well filled in the "mutton" points, docile in disposition, fair shearers, and good breeders, when not in too high flesh. They are hornless, have face and legs white, with occasional exceptions, wherein the mottles appear. The forehead is crowned with a long tuft of wool, by which it may be readily distinguished. The habit of some exhibitors is to allow this tuft to grow beyond its wonted length,—a reprehensible practice, both from the fact that it interferes with the symmetry of the animal's head, and because its presence is an imposition upon the unprofessional observer. Breeders of Cotswolds, both in England and this country, have for some years given strict attention to keeping them pure; a very commendable effort, which has been greatly facilitated by an organization representing most of the choice flocks of the Union and Canada, the labors of which have resulted in clearing away some of the mists surrounding the collection and collation of Cotswold pedigrees.

THE LEICESTER, as yet, holds second place in the estimation of American breeders. They are sometimes called Bakewell sheep, from the fact that somewhat more than one hundred years ago Robert Bakewell, of Dishley, England, bestowed great attention upon their improvement. When well fatted, the mutton is gross; hence its unpopularity in this land of cheap meats. They are below the Cotswold in size; like it, are without horns, are without wool in the face, which, like the legs, is mottled or "smutty." The fleece is quite uniform, rather more so than

COTSWOLD.

SHROPSHIRE DOWNS.

that of the Cotswold, which it resembles in a marked degree. The Leicester has many friends, and has merits enough to recommend it to a more general favor than it even now enjoys.

THE LINCOLN is a variety of the long wools, as yet quite scarce on this side of the Atlantic. It is quite popular in England, some writers placing it first in point of merit on the list, where size and quality of carcass, and character and weight of fleece are sought for. The face and legs are white, the head hornless, the wool remarkably glossy, attaining great length, and being much sought after for the manufacture of certain fabrics.

THE MIDDLE WOOLS embrace a very interesting breed of sheep, comprehending more varieties than are found under either of the other divisions. They are often spoken of as "Downs," taking such title from the less fertile lands upon which they are ranged. The most numerous variety, and, all things considered, the most popular, is

THE SOUTHDOWN, sometimes called the Sussex Down. A very dark gray or brown face and legs, a well-rounded form, quick and intelligent movement, and a remarkable ability to "look out for number one," are among the peculiarities which have combined to place the popularity of the Southdown high upon the breeder's lists on both sides of the ocean. Their blood and some of their merits enter largely into the make-up of other varieties of Downs. The wool is short, rather coarse, and fleeces are not obtained of sufficient weight to warrant their cultivation where really choice mutton cannot find a ready market. They are the smallest of the middle wools. They are very hardy, prolific, and are now hornless, though probably were not originally so.

THE HAMPSHIRE DOWN has an origin, like that of most of its "Down" cousins, enveloped in something of mystery. Spooner, probably as good authority as can be cited, was of the opinion that Cotswold blood was used in connection with Southdown upon the "original Hampshire." The sheep are large, well boned, firm in flesh, have black faces, fatten readily, and are quite popular with a certain class of English breeders. Very few will be found at the fairs in this country.

THE OXFORDSHIRE DOWNS possess the blood, and a combination of many of the excellencies of the Cotswolds and Southdowns. They are

large and remarkably well formed, have dark legs and faces, and show their Cotswold relationship by the tuft of wool on the forehead; shear a reasonably good fleece, and are destined to a broader popularity when more generally known.

THE SHROPSHIRE DOWN will be occasionally met with in the show-pens. It is a large-bodied, handsome animal, with many of the points of the Oxford, just described. It is the result of crossing the long-wools—probably both Leicester and Cotswold—upon the Southdown, and a hardy, dark-faced sheep, the Morfe Common, and from these breeding to a fixed standard. The characteristic of dark face and legs—though not so dark as the Southdown—and the absence of horns will be noticed, as in all other varieties of the middle wools.

FINE WOOLS—MERINO.—Though several varieties of fine-wool sheep are cultivated in the United States, it is seldom that any other than the American Merino will be found on exhibition. A few French sheep are owned in "the States," and a goodly number on the Pacific Slope. The French Merino has more size, though less hardiness, than the improved Spanish type, christened "American Merino." The Silesian Merino will be occasionally met with. These differ from the other varieties of fine wools in the absence of wrinkles,—especially observable in the rams,—and a longer, though less dense fleece. They are sometimes called Delaine Merinos, their wool being adapted to the manufacture of goods bearing that name.

"The little, greasy Merinos," as they are sometimes derisively termed, though possessing fewer attractions to the eye of the casual observer than most other breeds of sheep, are the backbone of the wool-growing industry of more than one nation. They, with their crosses, yield a large majority of the wool and fully half the mutton consumed in the United States. They are the sheet-anchor of Australian and South American sheep husbandry. Let him who doubts their merits as wool-producers carefully lay open the uninviting exterior of the fleece, and feast his eyes upon the lustrous fibres therein hidden, and then, if he can, repress his admiration for the humble bearer of the "golden fleece." The males of all the fine-wool varieties have heavy, spiral-shaped horns projecting from the side of the forehead, which they can use to advantage by way of defence or attack.

CARE AND MANAGEMENT.—Owners of sheep should give their flocks special care and attention. A well-watered, fed, and housed flock of sheep, during a severe winter, will be worth in the spring double and

sometimes treble as much as the same number of sheep left to take care of themselves.

If a sheep or lamb is noticed to droop or appears unwell, it should instantly be removed from the flock and placed in good quarters by itself. That sheep *may be* affected with a contagious disease, and though this individual sheep may not be worth much, yet the flock often form no inconsiderable portion of the farmer's wealth, and were the whole t be infected it might prove a serious loss to him.

The medicines used for sheep are much the same as those administered to cattle, the dose, of course, being much smaller,—say from one-fifth to one-sixth as much. In bleeding, the quantity taken must be governed by the size and condition of the animal and the nature of the disease. A pint will be a fair average bleeding for a full-grown sheep, and about one-third of a pint for a lamb. The proper place for bleeding is the jugular vein. Tie a cord around the neck, when the vein will rise so that it cannot be mistaken. An ordinary lancet or sharp penknife will answer to make the incision; the cut should be of sufficient size to allow the blood to flow freely.

The ewe carries the lamb five months. The ewe with lamb should be fed sparingly, giving enough, but not over-feeding her. The frequent cause of fever in the ewe is her too high condition. A week or ten days before her time she should be well fed, in order to give her strength at the time of dropping the lamb.

An experienced shepherd can always tell when the time of yeaning approaches. If the ewe is found in labor-pains and lying down, she should not be disturbed for at least two hours; nature will usually perform the operation without outside help. If, however, the lamb is not dropped in that time, and the ewe appears exhausted, it is time for the shepherd to render what aid he can. In cases of false presentation, he should oil his hand and insert one or two fingers and put the young one in the proper position. Nature will do the rest.

After birth, the lamb should receive immediate attention. If the place is an exposed one, the lamb should be removed to a shelter, no matter how rude, and placed upon straw. Two-thirds of the loss of young lambs arises from neglect at time of dropping.

American wool-growers or shepherds have yet much to learn in regard to the management of their flocks. For example, the sheep in Silesia are never exposed to much rain. Shelter and shade are provided for them, nor are they exposed to dust, for that is known to be injurious to the fleece. The greatest care is taken in the breeding. Men of experience are employed to go from farm to farm to examine the sheep and

select the best rams that can be found. The rams are closely examined as to their fleece-bearing properties, and all but the very best are sold off. The whole economy of the sheep-farm is as perfect as intelligence and industry can make it. For its value, there is no farm product that can be carried one or two thousand miles so cheaply and so safely as wool. A ton of wool is worth $750, at thirty-five cents a pound, or $500, at twenty-five cents. A ton of wheat is worth about $32, and of corn about $16. The freight is about the same for each, and is thus twenty-five times more for wheat and nearly fifty times more for corn than wool. This is worth considering, and shows how much better it is to turn corn into wool than to sell it.

WEANING LAMBS.—It is safest to wean lambs gradually. Some fine ewes are lost or injured by taking off the lambs suddenly, and then neglecting to draw the milk. When lambs are marketed, the ewes should be watched carefully, and every night when brought in examined to see if they require milking. If so, the milk should be drawn with the finger and thumb, and the udder drained nearly dry. If this is not done, the milk retained in the udder will cause garget, and the udder will almost surely tumefy and break and discharge, when it will become flyblown. This is a serious matter if neglected. Lambs that are retained should be put in a distant field by themselves, where they cannot hear the sheep bleat during the daytime. At night they may be turned in with the ewes. After a week, they may be left with the ewes for an hour only in the evening for another week, when the ewes will be nearly dry, and after this, the lambs may be kept entirely separate for a week longer. They should be kept in a good pasture after weaning. During this time the ewes should be examined carefully night and morning. If there is no reason to the contrary, the lambs may be kept with the sheep until they wean themselves.

THE TEETH.—The full-grown sheep has eight incisors in the lower jaw, none in the upper, and twenty-four grinders,—six on a side in the upper jaw, and the same number in the lower,—making in all, thirty-two teeth.

At birth the lamb usually has the two central incisors through, and in five or six weeks all the incisors will appear. The two first, or milk incisors, will be shed when the animal is twelve or fifteen months old, and two permanent ones will appear. At two years and past, two more permanent teeth will appear. At three years and past, the animal will have six permanent teeth, and at four years, eight, or a "full mouth."

COLD, or CATARRH.—Sheep that are left to shift for themselves during the long and severe winters of this country, are usually found in the

spring of the year with colds and catarrhal diseases. The symptoms are a thick yellow discharge from the nose. It clings to the nostrils, and obstructs the air passages; it is frequently accompanied by a cough. This disease rarely attacks sheep with sufficient violence to require the application of remedies. In order to arrest the disease and prevent its spreading to the throat and windpipe, it is advisable to bleed and physic them, and remove to a sheltered place, with good straw for bedding.

Foot-rot is usually caused by feeding upon low, marshy pasturage. The first symptom noticeable will be lameness. If the foot be examined it will be found to be hot; the animal shrinks if the foot be firmly pressed. The dry and natural condition of the foot will have disappeared, and it will appear rough and moist, and look red. The foot will soon become ulcerated and full of corruption, and have an offensive smell.

In order to cure this troublesome malady every particle of diseased hoof must be cut away; the parts must then be cauterized by applying corrosive sublimate, dissolved in spirits of wine or chloride of antimony. Some use a hot iron. Remove the sheep to higher ground. Some farmers, upon the first appearance of foot-rot, have removed the flock to higher and dryer ground, when all signs of rot would soon disappear.

Lice and ticks.—Sheep infected with these insects should be treated with the tobacco dip given under the head of "Scab."

Red-water.—This disease in sheep is quite different from the disease of the same name mentioned as attacking cows. Here the water accumulates in the cavity of the abdomen, and is of a dark or reddish color. It generally attacks the sheep late in the fall. Symptoms are loss of appetite, restlessness, disinclination to move, and heaving flanks. Bleed the animal freely, and administer a laxative medicine: One ounce each of Epsom salts and linseed oil; twenty grains ginger; dissolve in two ounces of warm water.

Rot in sheep.—This disease is very common and very dangerous. The cause can always be attributed to feeding upon damp pasture. The sheep appears to have some fever, is dull, moves slowly. In a few weeks more the animal will begin to waste away, appearing depressed, dull, and unhealthy. If the back be pressed with the hand it will feel soft and flabby, and there will be a kind of "crackling," as though there was water underneath; and when the hand is removed the indentation will remain for several seconds. The tongue will be found to be very pale. Treatment: Remove the affected sheep to dry pasture, on high ground, if convenient. Give plenty of salt, and also feed liberally of salted hay. Give the following mixture: Two drachms yellow resin;

one and one-third ounces oil of turpentine; fourteen grains calomel; forty drops tincture of iodine. This will make four doses, to be given in gruel for four consecutive mornings. Prevention is better than cure. Keep your sheep upon dry pasture.

THE SCAB is produced by an insect called *acari*. The disease is similar to the itch in the human family, and the mange in cattle and dogs. The insect adheres to the skin, and hides itself among the masses of scabs produced by its bite. The symptoms first noticed will be the sheep rubbing its body against anything it can reach. It will also try to bite and kick its sides and shoulders; the wool will finally fall off in patches. This disease spreads with great rapidity, and will infest a whole flock in a short time. The only remedy is to kill the parasites. Take three pints of lard, one-half pound of mercurial ointment, one gill oil of turpentine; melt the lard and stir the ointment and turpentine into it, and let it cool. Rub upon the parts affected.

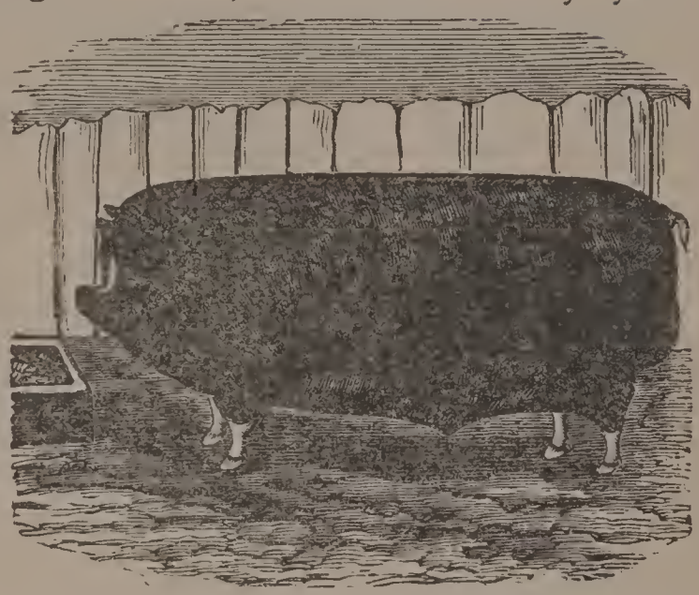
The Chicago *Live Stock Journal* says: "Tobacco dip is generally regarded as the safest, cheapest, and, all things considered, the best remedy for scab. The bath is prepared by using five pounds of tobacco to as many gallons of water, steeped at a temperature just below the boiling point, and stirred at intervals for an hour. In cases where the scab is very close and abundant, three pounds of soap, soft or hard, may be added to the above mixture to facilitate the breaking up and softening of the crusts, and one-half pound of flower of sulphur may also be thrown in. Care must be taken to prevent the immersion of the head, as the liquid will poison the sheep if swallowed in any quantity. At the end of a week the application should be repeated, to insure a thorough cure. The warm, dry weather of summer or autumn is the most suitable for this operation."

STAGGERS IN LAMBS.—This disease usually attacks lambs from three to six months old. It arises from the animal being overfed in an undue haste to prepare it for the shambles. It is simply a "rush of blood to the head." Bleeding must be resorted to in order to relieve the head. Afterwards give a light dose of Epsom salts in rain-water.

POLAND CHINAS.

DIFFERENT BREEDS OF SWINE.

BERKSHIRES.—This is an English breed, established many years ago. They will be recognized by their uniformity in color, which is black, with white marking in the face, on the feet, and the brush of the tail. Occasional small spots of white may be found elsewhere; but while they are not considered desirable by fancy breeders, they are in no wise an indication of impure blood. Sandy, or reddish-brown spots, may also occasionally be found, which are simply indications of a reversion to the original color of the breed, which was, quite often, black spots on a sandy ground.



The best type of the Berkshire, as now bred, has a short and fine nose, slightly dished or curved upward, is wide between the eyes, has small and fine ears, standing very nearly erect, straight back, of uniform width from shoulder to ham, short legs, and fine bone. Formerly, the Berkshire was not famous as a lard hog, but modern breeders have greatly improved the breed in this direction, if it be an improvement, until it is, perhaps, equal to any other in that particular. The prevailing tendency among the breeders of Berkshires has been toward this point for many years, and we now see but few of the big-boned, heavy-eared, and enormously large specimens of the breed that was common ten or fifteen years ago. The weight of the matured Berkshire of to-day is from 300 to 600 pounds. It is, perhaps, the most active and muscular of all our breeds of swine; and while this has often been urged as an objection to the breed, yet it is a quality that renders it especially desirable to follow cattle,—a method of feeding much practised by farmers in the great corn-growing regions.

THE CHESTER WHITE.—This is a breed that several years ago was very popular in the United States, and was quite widely disseminated; but either from lack of care on the part of those who professed to be breeding them in their purity, or from the dishonesty of dealers, there was

always a great want of uniformity in the specimens sent out. This fact, together with the white color, which by many is considered objectionable, has detracted greatly from their popularity, and they are no longer found in large numbers. The breed originated in Chester County, Pennsylvania, and it has furnished some of the largest specimens of the race ever marketed in the world. In shape of body, head, and ear, they closely resemble the Poland China, described below, but the color is always a pure white

THE POLAND CHINA.—This breed will fairly divide the honors with the Berkshires in the great corn-growing States. It is the breed variously known as Poland China, Magie, and Miami County hog. It unquestionably originated in the Miami Valley of Southern Ohio, and was the result of crossing several distinct breeds, and of long-continued selection with a view to producing great fattening qualities and early maturity, as well as great size; and while there is still a considerable lack of uniformity, it has clearly become an established breed. The color is black, with irregular white spots, the black largely predominating; and some of them with white markings, almost identical with those of the modern Berkshire,—a circumstance which sometimes leads to a suspicion of a recent Berkshire cross. But this suspicion is by no means warranted by the facts, as some of the purest bred specimens we have ever known were so marked. As a breed, they are larger than the Berkshire, more quiet and sluggish in their movements, heavier in the jowl and flank, and do not stand up so firmly upon their feet. In some cases, the ears are rather large and pendulous, but in the herds of a majority of good breeders of to-day, the ears, while always drooping, will be found quite small and thin. The head and snout is shaped much like those of the best bred Berkshires, although there is, perhaps, more of the "dished-face" tendency in the latter than in the former. This is the popular breed among general farmers all over the West, and its advocates claim that its quiet and contented disposition make it the best breed in the world for converting corn into pork and lard.

THE YORKSHIRES.—This is the oldest, and was originally the largest of the English breeds of swine. In fact, at one time they were of immense size, very coarse, with pendulous ears, and slow in coming to maturity. But the efforts of English breeders, aided by crosses with the Neapolitan and Chinese, have broken them up into several types, until we have the

Large Yorkshire, the Middle breed, the Small Yorkshire, and the Suffolk,—all from the same original, and all white. The Large Yorkshire is the old Yorkshire, refined and improved by selection. The Small Yorkshire is the finest-boned, smallest-eared, shortest-headed, most dished-faced, shortest-legged, and most easily-fattened pig in existence; and the Middle breed is, as its name indicates, about half-way between these breeds. They are all white, with occasional blue spots in the skin, which usually increase with age, and which probably come from a remote Neapolitan cross.

THE SUFFOLKS are also identical in form with the smaller type of the Berkshire. The ear is small and erect, head small and fine, bone light, legs short, color pure white, hair very thin, but usually long and fine, and they are among the very earliest maturing and most easily fattened breeds.

THE CHESHIRES are derived from the Yorkshires. Those a few years ago so popular in New York State, closely resembled the modern Large Yorkshire, while those breeds in Kentucky and the West were smaller and finer, and were almost identical in size, form, and disposition with the average Berkshire. They are white, with occasional blue spots in the skin, as is usual with all the modern Yorkshire families of swine.

JERSEY REDS, or DUROCS.—These are sandy, or yellowish-red hogs, with black spots; are large, but not very uniform in appearance; and are, probably, derived mainly from some of the earlier importations of Berkshire swine, which were of this color. In fact, they bear a close resemblance, so far as they have a uniformity of type at all, to the large Berkshire of fifty years ago.

THE ESSEX.—This is an English breed, round-bodied, fine-boned, with small heads and ears, and of a pure black color. They are not so large as the Berkshires, although in many respects they are quite similar in appearance; but no white markings are ever found upon an Essex.

CARE AND MANAGEMENT.—In raising swine for any purpose it is advisable to keep the pens clean. Where pens are improperly constructed, this may prove troublesome, but it will pay in the end. The feed trough should be scalded regularly, and a good supply of pure water should be kept within reach. Chloride of lime should occasionally be sprinkled about the pen. Salt, sulphur, and charcoal should be placed within reach.

The period of gestation in the sow is about sixteen weeks. Commence feeding the pigs when they are eighteen or twenty days old. Castration should be performed just before weaning. A trough should be provided for the pigs separate, and apart from the one used by the sow.

The following, taken from the *National Live Stock Journal* of Chicago, is worthy of perusal by breeders of swine:

"NORMAL DIET FOR PIGS.—The intelligent feeder should study the natural habits of the animal he feeds. This point is often greatly neglected. The fact that the pig is a grass-eating animal is almost wholly ignored, except as an economy in summer feeding. It does not seem to occur to pig-feeders generally that it is doing violence to his nature to feed him wholly upon concentrated food, as much as to feed a horse wholly upon grain. The one requires coarse, fibrous food as much as the other. When such intelligent feeders as the conductor of the pig experiments at Michigan Agricultural College, a few years ago, and the celebrated J. B. Lawes, of England, undertake to demonstrate the value of corn-meal as a food for pigs, by feeding it pure and simple, without any mixture of grass or other fibrous food, we may well suppose that a lesson is now and then needed, on the nature of the pig and his normal diet.

"At Michigan, a series of experiments were carried on in several different years to show the cost, in food, of producing a pound of pork from different foods, and particularly corn-meal. The experimentor began with pigs a few weeks old, and fed them for a time on milk—which was wise, being the best food for the young animal—and noted the pounds of milk required to make a pound, live weight. But when he began feeding corn-meal, to test its feeding value, he treated the pig as capable of living and thriving wholly upon the most concentrated food, and he only fed corn-meal soaked in water, which was forgetting the nature of the animal. This meal went into the stomach in the form of solid dough. The gastric juice could not fully penetrate it, and it remained too long undigested, and the consequence soon was a feverish state of the system, causing a loss of appetite and a stoppage of growth. Yet this time goes into the experiment to test the value of corn-meal in

making pork. How can the true value of any food be tested upon sick animals? But J. B. Lawes, of Rothampstead, tried the feeding value of corn-meal upon pigs in the same way, feeding corn-meal alone; and the result was the same, the pigs often eating in a mincing manner or refusing to eat; but the experiment went through as if that were the only proper way to try it. The amount of meal, in the two cases, required for a pound of live weight was nearly the same—about four pounds and three-quarters.

"Shortly after reading in the *Royal Agricultural Journal* this experiment of Mr. Lawes, we concluded to test the two modes of feeding; and taking a litter of six pigs, five weeks old, we divided them into two lots, as nearly equal in weight and thrift as could be done with the eye. This was on the 1st of June. One lot of three was put into a pen and fed on the same system as that adopted at Michigan and at Rothampstead—corn-meal soaked in water twelve hours, *ad libitum*. The other lot was put into a pen alongside, and fed upon green clover, cut short by a straw cutter, and mixed with corn-meal. At first only one quart of this cut clover was fed each pig with all the meal they would eat. This meal, being mixed with clover, the particles were separated, and, when eaten, went into the stomach in a spongy condition, so that the gastric juice could penetrate the mass as water a sponge. Thus the gastric juice came in contact with every part of the mass at once, and the digestion was soon accomplished. This lot of pigs, with the clover and meal, were always lively, always ready for their feed; whilst the other lot, with meal alone, ate greedily for a time, then became mincing and dainty for a few days, showing a feverish state of the system, contenting themselves for a few meals with water, and by fasting got over it and went on eating again. This was repeated many times during the five months that the experiment lasted. At the end of the time the two lots were weighed. The lot fed on meal alone weighed one hundred and fifty pounds each; the other lot, two hundred and ten pounds each, or forty per cent more for being treated as grass-eating animals. Each lot consumed the same amount of meal. The clover, in this case, was given in small quantity, and intended merely to furnish a divisor for the meal. The amount never exceeded two quarts of cut clover at a feed. We have since fed pigs this way in summer, giving all the cut clover they would eat. This will be found the best way to feed pigs where it is inconvenient to give them a run in pasture. They have always been healthy under this treatment, which we call the normal ration—grass alone, or grass and grain mixed. But larger growth will be made by feeding a small portion of oil-meal, mingled with the corn-meal and

grass; the oil-meal being rich in nitrogen and phosphate of lime, to grow the muscle and bone, giving a larger growth to the frame, and thus making more pounds of pork in a given time.

"In order further to test this matter of feeding fibrous food with grain, we experimented, in winter, with two lots of pigs, two in each lot. Each lot weighed 150 pounds at the commencement of experiment, and were all of the same age. The trial continued one hundred and twenty days. One lot was fed corn-meal, wet up with hot water, and allowed to stand for a few hours. The other lot was fed a little short-cut clover hay and corn-meal, wet up with hot water, and allowed to stand. In this case, also, each lot consumed about the same quantity of corn-meal. The pigs on meal alone were healthier than those in the other experiments, as they were older, and, the weather being cold, were not so feverish. This lot gained 110 pounds per head, and the lot on clover hay and meal gained 143 pounds each, or thirty per cent more.

"There is, no doubt, a great loss every year to farmers, for not treating the pig as a grass-eating animal, and giving him his normal ration."

CATARRH in pigs is caused by inflammation of the mucous membranes of the nose, etc. This disease, if attended to in time, can be easily cured. The animal should be placed in a warm and sheltered sty, and sparingly fed upon light diet, avoiding corn, or farinaceous food. The bowels should be moved, and a warm bran-mash given.

CHOLERA has for years committed fearful ravages among swine in the United States, and particulaly in some of the Middle and Western States. The symptoms are: Loss of appetite; the eyes appear dull and haggard; quick pulse; if the sides be pressed with the hand, the animal will shrink, thus evincing soreness; the evacuations are frequent, dark, and fetid. There is no known cure; many have been recommended, but we prefer not to give them. *Prevention* is better than cure. (See article on Care and Management.)

FEVER.—In this disease the mouth and head appear hot and dry, and the eyes red, with very little, if any, appetite. The thirst appears insatiable. The animal should be bled immediately; this is best accomplished by making two incisions, one on each side of the palate, about half way between the centre of the roof of the mouth and the teeth. Use the same method to stop the flow of blood as is recommended in bleeding horses. Mix the following, and give in a little warm swill or mash: One-quarter ounce of flour of sulphur; three grains Æthiops Mineral, and one-half drachm nitre and cream of tartar.

JAUNDICE is distinguished by a peculiar yellow tint observable in the white of the eye, and sometimes in the lips, accompanied by loss of appetite.

Treatment.—Bleed freely, and administer the following mixture, making two doses of it twelve hours apart: Half a pound of flaxseed; flour of sulphur, quarter of an ounce; powdered blue flag, one quarter of an ounce; powdered golden seal, one quarter of an ounce. If the animal is not better in forty-eight hours, repeat the dose.

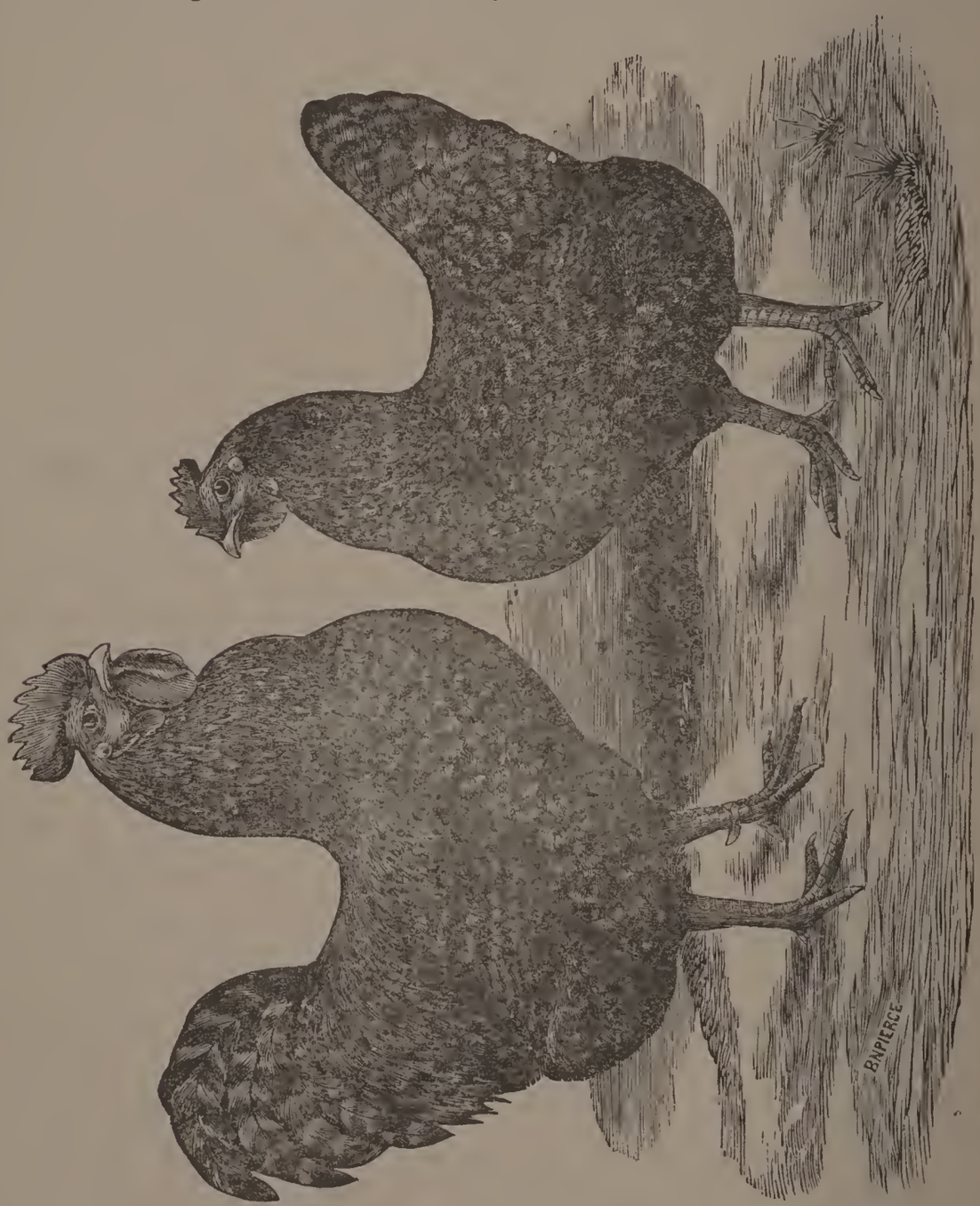
Mange.—This disease, like the scab in sheep, is very infectious. It is caused by a small insect called *acarus scabiei*, which burrows beneath the cuticle, irritating the skin, and causing the animal to rub itself against trees, fences, posts, etc. The following ointment will speedily cure the worst cases: One pound of flour of sulphur; four ounces Venice turpentine; two pounds of lard; four ounces mercurial ointment. Rub well together.

Vermin.—When a pig is observed to be continually wallowing and rubbing itself against everything it can reach, an examination will probably reveal the presence of vermin. The following will rid the animal of these pests: Rub the pig all over with crude petroleum, and twenty-four hours after, wash it with strong soap-suds and lye, using a common scrubbing brush.

Another plan is to boil tobacco leaves in water until they float, and then add enough grease to make an ointment. Rub the pig well with this, and the vermin will soon disappear.

DIFFERENT BREEDS OF POULTRY.

Plymouth rock.—This is decidedly an American breed, probably originating, as the name would suggest, in one of the New England States. The origin is not definitely known, and much bitter contro-



versy has arisen in regard to it. They are good breeders, excellent layers, and, when properly fattened, make a fine table-bird. They are hardy, and therefore much preferred by most farmers. The Plymouth Rocks were first brought to the notice of fanciers by Dr. Y. C. Bennett,

LIGHT BRAHMAS.

at Boston, in 1840. Since then they have been widely disseminated throughout the United States, and give fair satisfaction to breeders.

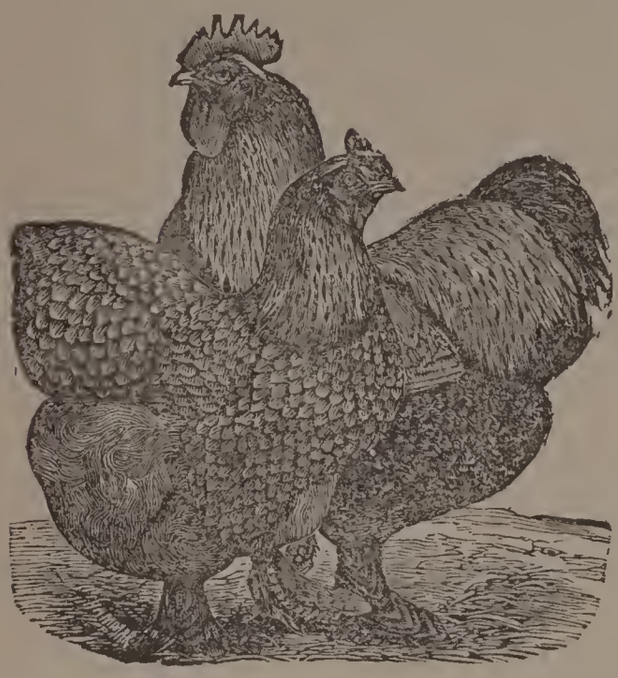
DORKINGS.—This is a celebrated English breed of fowls, noted for their rapid growth and large size, a single cock sometimes weighing as much as ten pounds. They mature early, and are of a most excellent quality of flesh. Their heads are large and strong, full wattled, with single, serrated combs. They vary in color, the white Dorking being the standard, followed by the black, fawn-colored and silver gray.

LEGHORNS.—This breed originated in England, but is now extensively raised and bred in this country. They are a quiet and hardy fowl, good layers, and valued by fanciers for their great beauty. They are bred of all colors, white, black, and brown being the principal. The cocks are adorned with a very large single comb, which stands erect and gives the bird a fine appearance. The legs and skin are usually yellow. The wattles are full and large. The hens are persistent layers, the eggs averaging eight or nine to the pound. They are non-setters.

POLISH.—This breed is much admired by fanciers for their rich plumage, especially the "top knot" which adorns the head. In size they are medium, and make excellent table-birds. The hens are liberal and persistent layers, their eggs being of medium size, averaging six or seven to the pound. They are not good setters. The cut here given will show the general appearance of this breed, and the chief peculiarity of the head. They are bred to various colors, white, black, gold, and silver predominating.

BRAHMAS.—This large fine breed of birds is said to have originated in British India, taking their name from the "Brahma"-pootra river which waters that country. They are divided into two classes—Light and Dark. The Light Brahma seems to be the favorite with fanciers, although either are good enough for most farm-yards. The head is adorned with three combs running parallel, and is a distinguishing mark; tails short, wings small, legs short and covered with feathers. The engraving opposite will give the reader a good idea of this breed.

COCHIN CHINA.—There are several varieties of these fine birds, among which may be mentioned the Buff, Partridge, and White Cochin. We shall here give a brief description of the Partridge Cochin, which will answer for the other varieties, excepting color. The head should be of a bright orange red; with the exception of a stripe down the centre, the saddle and hackle feathers are the same color; the back, shoulder and wings, are dark red; the lower wing-coverts black, with greenish reflections forming a "bar" across the wings; the legs yellow and heavily covered with feathers. The head should be small; the beak yellow, short, and curved; fine florid wattles. The cock should be upright and strong in his carriage



GAME.—The game chicken is to the fancier what the throughbred horse is to the jockey. They are bred and raised in every country, China and Spain being most celebrated for their strains of blood. The cocks are noted for their courage, and will attack almost any animal, and fight till death overtakes them. The hens are hardy and good foragers, and take excellent care of their brood. Among the breeds may be mentioned the brown and red-breasted, Duck Wing, and Bantams, the red-breasted game being the favorite with fanciers. They are not to be found with the ordinary farmer, owing to their pugnacious qualities, being almost continually at war with the other cocks. A description is therefore unnecessary in these pages

MANAGEMENT OF POULTRY IN SUMMER.—Many have an idea that, although hens need care in winter, when the weather is cold and water freezes in their pens, it is not at all necessary to pay any attention to them in summer. But this is a mistake, under any circumstances. In summer, vermin abounds; the pens and runs become coated over with droppings; ventilation is needed; clean, fresh water must be supplied and wholesome food furnished, in such quantities that it will not become stale and uneaten in the pens. To attend to all these things requires time and care; but without time and care what profit or success comes in any line of effort? Eggs fall off during the very hot weather of summer, in consequence of the unfavorable conditions of the season, unless these conditions are met and overcome by proper attention,

This being the case, the hens are healthy and the number of eggs is kept up,—two results which always follow good care.

Remember, then, that the best economy of the poultry-yard demands that it have daily care throughout the heated months. Fresh water given daily, a change of food, and a constant watch that an over-supply be not given at any time; fresh grass and sods placed in the yards at intervals of a few days; abundant ventilation of the pens must be given; the droppings kept cleared up; the perches occasionally coated with a mixture of lard and sulphur; dust baths furnished, and a thorough watchfulness. Turn the hens from their pens and give them the benefit of a leg-stretching in the garden and among the grass or fruit trees. While they are enjoying this airing, get a spade and dig over the earth in the pens. It will be a good exercise, and the next morning the hens will think they have new quarters. Attention to these things will yield health to the hens and a good supply of eggs for the family right through the hot weather.

Whole wheat for fowls.—There is more solid nutriment in whole wheat, as a feed for poultry, than in any other of the cereals, weight for weight. It is an excellent kind of grain for this use, though somewhat more expensive than many other sorts; but too much of this hearty feed is detrimental, particularly when fed to Cochins, Brahmas, etc. Fowls are very partial to wheat. It helps the laying capacity of hens, but it should not be used except with discretion as to quantity allowed them daily. An excess of this raw grain will induce a looseness in the bowels very frequently. It is easy of digestion, and should be furnished in moderation, as a needful and most desirable variety, in conjunction with other dry grains—such as cracked corn, oats, barley, buckwheat, etc. If not more than one-third or one-fourth of wheat is allowed with the other cereals mentioned, for ordinary purposes in the laying season, hens will do quite well, as they can thus be kept in better average condition than by a greater allowance. We have proved this by frequent practical experiments in feeding.

Fattening fowls.—What a different taste a fine, nicely and quickly-fatted fowl has, when served on the table, compared with one which has been forced to scratch for all its living, and then be consigned to the spit in anything but a fit condition for food. Farmers realize the importance of fattening quickly when feeding beeves for the butcher, yet many do not seem to realize the fact that what holds good with that kind of meat is equally true when applied to fowls. Tenderness and juiciness are results of fattening quickly, while mere ordinary flavor and want of tenderness result from letting fowls run until wanted for use on

the table. To enable one to fatten fowls or chicks quickly, it is absolutely necessary to give such food as will accomplish the purpose best, and to this end we unhesitatingly recommend plenty of milk, in any state, from fresh to thick. This should be fed in connection with a grain diet, for one counteracts any possible deleterious influence of the other. If kept in a darkened place and fed unsparingly on milk, with grain food in the proper proportions, you will soon have something very choice to set upon your table to your friends, as well as to your family. When milk is fed, no water is required for fattening fowls.

A poultry house may be freed from lice by first thoroughly cleaning out all manure, then removing the roosts and everything in which lice may harbor. Next take a gallon of kerosene oil, and saturate every crack in which lice may gather; take out the floor and leave the earth; and give the whole a thorough soaking with hot lime wash. Lastly, grease the roosting-poles with lard and kerosene oil, so that it may get upon the fowls' feathers.

DISEASES OF POULTRY.—Fowls are particularly liable to colds, as the air-cells occupy so large a part of their physical framework. Where there is a slight cold, put the fowl in a warm, sunny place, give warm food, and nothing more will be needed. The same method should be pursued in hard colds. If there is much fever, put four drops of tincture of aconite into the water, or sweeten it, and make it a little sour with sulphuric or nitric acid. Add to the food a pinch of ginger or cayenne pepper. If there is much swelling about the head, a mild purge will be useful. The homœopaths give mercus virus for slight colds, euphrasia for more serious ones; each thrice daily, adding aconite for the fever.

A ROUP may only begin with catarrh, and, like catarrh, and bronchitis, sometimes cause death. But how are we to know such cases from roup? Simply by the offensive discharge at the beak which characterizes the latter disease. When the fowl has a discharge at the beak that is not offensive, you may call it a simple catarrh or common cold. When the odor is bad it is roup. No better distinction is possible in the present state of knowledge of fowl ailments. The difficulty in telling these maladies apart will suggest to the careful poulterer prompt isolation of cases where he is not certain. Dr. Bennett, in his "Poultry Book," remarks: "But for roup and all putrid affections I consider the following the only true treatment: Take finely pulverized, fresh-burnt charcoal and new yeast, of each three parts; pulverized sulphur, two parts; flour, one part; water, quantity sufficient; mix well and make into boluses of the size of a hazelnut, and give one three times a day.

Cleanliness is no less necessary than warmth. It will sometimes be desirable to bathe the eyes and nostrils with warm milk and water, or suds, as convenient."

COUGH may come from parasites in the air-passages. This applies more particularly to the sneezing effort caused by the gape worm in the throat of young chickens. A spasmodic cough, lasting a whole day, even, is reported as having accompanied the epizootic. It yielded under a treatment with potash.

CONSUMPTION, or tubucular deposits, may be suspected where a cough does not yield to treatment, and admits of no other explanation. Cod-liver oil in barley-meal would be the treatment if any one really wanted to save consumptive fowls. They ought to be killed.

ASTHMA is nothing more than roup, as far as we know, and very likely this name may have been given to cases of that sort.

DIARRHŒA—The symptoms are too well known to need a description here. Fowls that are properly fed and supplied with coarse sand or gravel of suitable size are seldom troubled with diarrhœa. When the disease is the result of wet, sloppy food, the diet should be changed, and water given sparingly. Make small bread pills of equal parts of powdered chalk, rhubarb, and cayenne pepper. A pill for a grown fowl should be as large as a pea, and one of a fourth the size for a chick ten days old. Give bone-meal, a teaspoonful to a pint of food, three times a week.

GAPES.—This disease is a frequent and dangerous one among fowls. The cause is attributable to unwholesome food and tainted water. All domestic birds, particularly young fowls, are subject to it. The attacks usually occur during the summer months—July and August. It is epidemic. The disease is caused by small red worms, about the size of a cambric needle, which infect the wind-pipe, causing the bird to cough, gape, and sneeze, resulting in inactivity, loss of appetite, and ruffled feathers. Medicines given internally do not accomplish much good. The following is about the best known remedy: Take a small goose-quill, and strip to within half an inch of the small end; dip in spirits of turpentine, and pass down neatly through the small opening of the wind-pipe, which is readily seen at the base of the tongue; give it one or two turns, and withdraw quickly. This will kill the worms, and the application excites coughing, and the worms will be coughed up.

Prevention.—Wheat soaked in turpentine, and given to young chicks when five or six weeks old is said to be a good preventative.

THE PIP.—This disease is attributable to the same general causes as gapes. If the tongue be examined it will be found to be covered with a

dry, horny scale; the beak becomes yellow at the base, the plumage ruffled the appetite gone, and the bird has more or less fever. Feed the bird on fresh vegetable food—onion and parsley chopped and mixed with potatoes or oat-meal. Apply to the tongue, with a small brush or piece of sponge, a little borax dissolved in water and tincture of myrrh.

WHITE COMB.—This disease makes its appearance in the form of small white spots on the sides of the comb of the cock. If only casually observed, the head would appear to be sprinkled with meal.

Remedy.—Make an ointment of two ounces of cocoanut oil and half an ounce turmeric powder, and give four or five applications.

HOW TO KEEP EGGS.—1. In the common "liming" process a tight barrel is half filled with cold water, into which is stirred slaked lime and salt in the proportion of about one-half pound each for every pail or bucket of water. Some dealers use no salt, and others add a small quantity of nitre—one-quarter pound to the half-barrel of pickle. Into this the eggs, which must be perfectly fresh and sound, are let down with a dish, when they settle to the bottom, small end down. The eggs displace the liquid, so that when the barrel is full of eggs it is also full of the pickle. Eggs thus pickled, if kept in a cool place, will ordinarily keep good for several months. Long storage in this liquid, however, is apt to make the shells brittle and impart a limy taste to their contents. This may be in a great measure avoided by anointing the egg all over with lard before putting in the pickle. Eggs thus prepared are said to keep perfectly for six months or more when stored in a cool cellar. 2. Select perfectly fresh eggs, put them, a dozen or more at a time, into a small willow basket, and immerse this for five seconds in boiling water containing about five pounds of common brown sugar per gallon of water. Place the eggs immediately after on trays to dry. The scalding water causes the formation of a thin skin of hard albumen next the inner surface of the shell, the sugar effectually closing all the pores of the latter. The cool eggs are then packed, small end down, in an intimate mixture of one measure of good charcoal, finely powdered, and two measures of dry bran.

PACKING EGGS.—The secret of packing eggs for importation lies in solid packing, with an elastic material between the layers. Be sure, especially in the summer season, that the eggs to be shipped are not only sound, but recently laid. The motion of the cars so muddles all eggs not entirely fresh that they appear cloudy and stale, and will soon spoil if they are not already bad. Do not hold lots after they are packed; ship at once while fresh. A New York commission merchant furnishes the following directions for packing eggs for shipment: Use long, stiff barrels. Put two or three inches thickness of long, soft hay

or straw evenly over the bottom of the barrel, then fine-cut straw or wheat chaff (never use oat or buckwheat chaff) to a depth of two or three inches, then a layer of eggs laid upon the sides evenly embedded in the packing, with the ends toward the barrel, but fully an inch from the staves. Cover this layer of eggs with packing to the depth of one inch; rub well in between the eggs with the hand. Place about three inches of packing material over the last layer, and then about the same quantity of long straw or hay as at the bottom, filling so high that the head must be pressed by a lever or other mechanical power. This will hold the contents so firmly that they cannot shift in the barrel. In winter guard against frost by using more packing material, leaving the eggs further removed from the packages. Never pack in new oats, straw, or chaff; these will sweat and rot the eggs in a short time. Dry oats make good packing material, but are too expensive. Do not crowd too many eggs in one package. For an ordinary flour barrel from sixty-five to seventy dozen are quite sufficient. Put, say, four and a half dozen in the first layer, and increase, half a dozen to the layer, up to six and a half dozen in the two middle layers, then decrease again at the same rate. Count carefully; mark the number on the barrel. In warm weather forward the packages by express. When only a small quantity of eggs are sent, and at short distances, those may be packed in mill-board partitions, an egg in each square cell, thirty-six in a layer, resting on cardboard sheets, one above another, and the whole contained in a handy-sized packing-case. Or, with careful packing in straw and chaff, baskets may be used. When there is a sufficient quantity to fill it, a barrel makes the best package.

Sex in eggs.—A correspondent of the *London Journal of Horticulture* says, in reference to this question: "Last winter an old poultry keeper told me he could distinguish the sex in eggs. I laughed at him, and was none the less skeptical when he told me the following secret: Eggs with the air bladder on the center of the crown of the egg will produce cockerels; those with the bladder on one side will produce pullets. The old man was so certain of the truth of this dogma, and his poultry yard so far confirmed it, that I determined to make experiments upon it this year. I have done so, carefully registering the egg bladder vertical or bladder on one side; rejecting every one in which it was not decidedly one or the other, as in some it is very slightly out of center. The following is the result: Fifty-eight chickens were hatched; three are dead, eleven are yet too young to decide upon their sex; of the remaining forty-four, every one has turned out true to the old man's theory. This, of course, may be an accidental coincidence, but I shall certainly try the experiment again."

Eggs for Hatching. — In selecting eggs for the purpose of hatching, choose the medium size, rejecting unusually large or very small eggs, the shell should be smooth and the egg short and round. Reject sharp pointed eggs, also those with a rough shell.

Poultry Houses, to Fumigate. — Fumigating poultry houses with sulphur is said to be a good way to rid them of all kinds of insects. Take an earthen vessel of live coals and set in the middle of the floor, and throw a handful or two of sulphur upon the coals. The house must be closed and left for several days. Care should be taken to guard against suffocation, or fire, and the fowls should be removed to safe quarters for the time being.

Hens Nests. — These should be made of straw and thoroughly sprinkled with wood ashes or pulverized charcoal. Such a nest will prevent the eggs from getting chilled while the hen is away, and will also prevent the fowl from being attacked by vermin.

Hens, to Prevent Setting. — Put about two inches of water in a large tub, and place the hen in it; cover with a board and leave for twenty-four hours. This is said to be a sure preventive.

GENERAL INFORMATION

IN REGARD TO

HORSES, CATTLE, SHEEP, SWINE AND POULTRY.

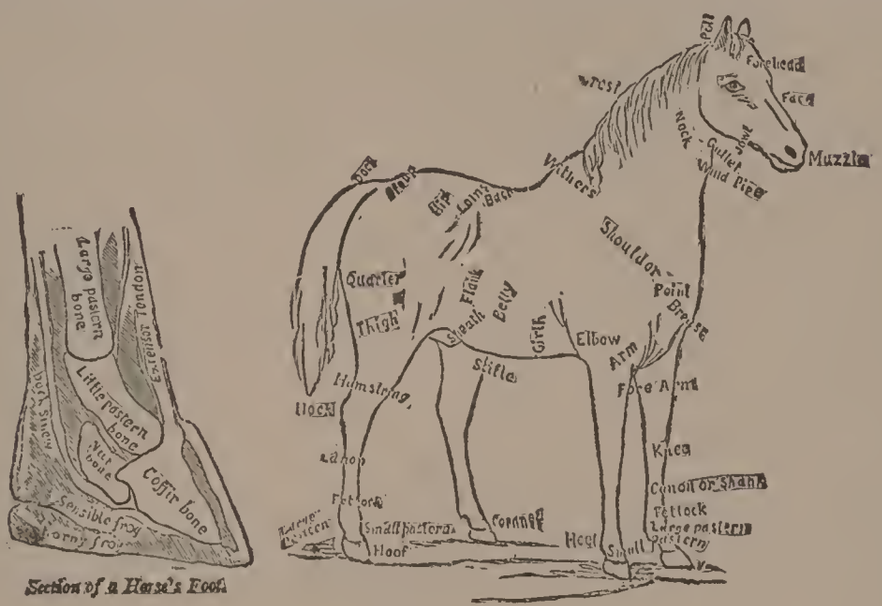


Figure 1.

ANIMALS.—COMMON TERMS DENOTING EXTERNAL PARTS.—For the benefit and interest of our young readers, we give in the annexed figures an explanation of the more common English terms used in describing the external parts of horses and cattle. The names being placed upon the parts designated, the impression is vividly and distinctly made through the eye, in a better manner than by the usual mode of references.

The structure of a horse's foot, which every one who owns a horse should understand, is distinctly exhibited in the above figure.

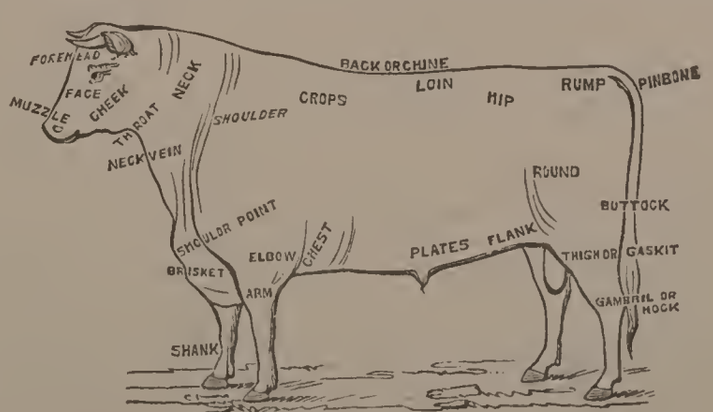


Figure 2.

GESTATION OF ANIMALS.—The following is a complete and reliable table of gestation of different animals:

Kind of Animal.	Proper age for Reproduction.	Period of the power of Reproduction.	No. of females for one male.	Period of Gestation and Incubation.		
				Shortest period.	Mean period.	Longest period.
		years.		Days	Days	Days
Mare,	4 years.	10 to 12	- -	322	347	419
Stallion,	5 years.	12 to 15	20 to 30	- -	- -	- -
Cow,	3 years.	10	- -	240	283	321
Bull,	3 years.	5	30 to 40	- -	- -	- -
Ewe,	2 years.	6	- -	146	154	161
Buck Sheep,	2 years.	7	40 to 50	- -	- -	- -
Sow,	1 year.	6	- -	109	115	143
Boar,	1 year.	6	6 to 10	- -	- -	- -
She Goat,	2 years.	6	- -	150	156	163
He Goat,	2 years.	5	20 to 40	- -	- -	- -
She Ass,	4 years.	10 to 12	- -	365	380	391
He Ass,	5 years.	12 to 15	- -	- -	- -	- -
She Buffalo,	- -	- - -	- -	281	308	335
Bitch,	2 years.	8 to 9	- -	55	60	63
Dog,	2 years.	8 to 9	- -	- -	- -	- -
She Cat,	1 year.	5 to 6	- -	48	50	56
He Cat,	1 year.	9 to 10	5 to 6	- -	- -	- -
Doe Rabbit,	6 months	5 to 6	- -	20	28	35
Buck Rabbit,	6 months	5 to 6	30	- -	-	- -
Cock,	6 months	5 to 6	12 to 15	- -	- -	-
Turkey,	- -	- - -	- -	24	26	30
Hen,	- -	3 to 5	- -	19	21	24
Duck,	- -	- - -	- -	28	30	32
Goose,	- -	- - -	- -	27	30	30
Pigeon,	- -	- - -	- -	16	18	20

ANIMALS—Doctoring sick.—One of the best systems of medical practice ever known, and which will probably stand at the head of the list for all coming time, is Nursing. Good care will do more than all the medicine in the world without it. Medicine is sometimes very good, but the most skillful physicians have found they could do but little with serious cases without that intelligent and careful watching at all times required for the removal or prevention of irritating causes, and known as good nursing.

The writer once owned a horse suffering from an excessive cough. Numerous remedies were prescribed by kind neighbors, enough, doubtless, to have killed him at once. It was concluded to discard all, to give the best attention to his wants, and avoid everything which caused or prolonged a cold. This was during the changeable weather of Autumn—and he was blanketed whenever a chilly air was apprehended; he was worked very moderately, always avoiding perspiration, and he was fed on succulent food which was supposed to favor expectoration, and especially young clover. In a few weeks nature had performed a perfect cure; and if any

one of the nostrums had accidentally been employed, and had not proved very prejudicial, it would unquestionably have received high praise for its efficacy. It is of the utmost importance to discriminate between a recovery *by virtue* of a medicine, and *in spite of it.*

To keep animals in health, is more important than to cure sick ones, and for this purpose a few leading rules should be always observed, and which cannot be out of place here.

1. Always feed regularly, as to time and quantity. Many animals are made sick by starving at one time, and stuffing at another. Especially, never *overfeed.*

2. The same rule must be observed with watering—let the water be *pure.*

3. Never *overwork* an animal—regular and moderate exercise will enable a working animal to do more the year through, by all odds, than any hurried driving at one time and resting and overfeeding at another; and be infinitely less liable to disease.

4. Allow a regular supply of salt—it is useful, but an observance of the preceding rules without salt, will be incomparably better than their infraction with it.

5. Never feed musty or bad food. If musty fodder must be used, pass it through a rapid cutter, and moisten, salt and meal it.

6. Avoid unwholesome or poisonous plants in pastures and in hay.

7. Guard all animals against cold rain and snow falling on them, and against lying on cold wet ground.

8. All changes of food must be *gradual.* If from hay to grass, let the grazing be but an hour the first day, two hours the next, three the next, etc. The same caution must be carefully observed in beginning to feed with roots, grain, etc.

9. Be careful that animals always have enough of exercise—and plenty of pure, fresh air. Stables must be well ventilated—animals often become sick from breathing foul air.

10. Lastly, and by no means least, let strict cleanliness be observed. All animals, even pigs, kept clean and curried, are found to maintain their flesh better, or fatten faster, than when dirty and neglected—and cleanliness is more important to health than for flesh.

We do not propose to go into a long discourse on diseases and their remedies, but there are a few of the more common diseases and some simple remedies for them, a knowledge of which may be useful to the inexperienced.

HORSES.—COLIC AND INFLAMMATION OF THE BOWELS, are two very common diseases, often confounded together. With colic the pulse is natural, not fifty a minute, the animal often rolls, the disease intermits, and

there is usually not much fever. With inflammation there is much fever, the pulse sometimes rising to nearly a hundred a minute, the attack is gradual, and the disease does not intermit.

The remedies proposed are of the simplest character, and not those often used by professional men.

For colic.—If from badly digested food, give a pint or more of a solution of saleratus; or a mixture of half a pound or upwards of fresh powdered charcoal with thrice its bulk of water, is still safer. Spasmodic colic may be treated with the charcoal internally, and brisk friction externally, and a quart of peppermint tea with a spoonful of powdered cinnamon may be given. Ginger tea is also useful.

For inflammation of the bowels.—This is a difficult disease to cure and horses generally are killed by the amount of irritating medicines administered, which only add to the disease, such as whisky, gin and molasses, salts, castor oil, gunpowder, etc., etc. Give a drink of slippery-elm every hour, to allay irritation—keep the animal quiet—let him have but little food, and let that be weak gruel. Avoid bleeding.

Scours or diarrhœa.—Sometimes this arises from irritating matter, in which case it must not be checked too soon. When it proceeds from exposure after over-exertion, let all the drink the animal takes be slippery-elm water, with occasional doses of a spoonful of charcoal. The food should be dry. Raspberry leaf tea is a good drink, after the symptoms begin to subside. In severe cases, twenty or thirty grains of kino may be given in a quart of thin flour gruel, twice a day.

Cold or catarrh.—This is a common and well-known disease. Medicines generally are of little use except to allay attending symptoms. Good nursing and careful management are best, avoiding any exciting cause calculated to increase the disease, or retard the gradual cure that nature commonly effects. If followed or accompanied by a hard cough, green food should be given—if in winter, turnips or ruta bagas with warm wet meal are useful. A moderate feeding of fresh apples two or three times a day operates as an expectorant, and relieves the cough.

Heaves.—When a horse is fed on musty hay, and his cough begins to assume symptoms of heaves, immediately procure good hay, if possible, or else cut the hay fine and always feed it wet, to which add a spoonful of ginger daily until the symptoms disappear. A horse which has the heaves once established, cannot be cured, but the disease may be kept so latent as to be of no inconvenience, by always feeding wet chopped food.

Scratches.—(A cutaneous and troublesome disease just above the hoof.) Keep the affected parts clean, by washing with soap and water, and then apply a solution of chloride of lime.

DISTEMPER OR HORSE AIL—(attended with thickened discharges from the nose, and sore throat, often a tumor under the jaws, and weakness.) Rub and curry often to promote warmth and circulation, keep warm and comfortable, and if the animal refuses to eat, withhold all drink, but place before him warm mashes which he will swallow, when he finds his water is not given. He will often eat wet hay, slightly salted, if given him morsel after morsel by the hand. Scraped carrots are excellent. The principal object is to keep up his strength and flesh, until the disease runs its course. A seton is often advisable, diverting the disease.

CATTLE.—If the ten rules already given are carefully observed, cattle will scarcely ever become diseased; and if they do, immediately examine to see if some of these rules are not broken. The following remedies may be applied, in case of a few of the more common diseases.

HORN AIL.—The symptoms are dullness, failure of appetite, giddiness, failure of flesh, the horn generally feels cold. The head and not the horn merely is diseased. Boring generally is of no use, and can only give temporary relief where there is a pressure of matter in the horns. Hornless cows have it sometimes. It generally occurs to animals in low condition, with deranged digestive organs. The best remedies are to keep them in a warm shelter, and to give warm, nourishing, and stimulating food. If the animal should happen to be in high condition, feed lightly. Most of the remedies have their reputation because they do not *prevent* natural recovery.

GARGET OR CAKING OF THE BAG.—Let the calf suck, after having drawn off a part of the milk; and if there is danger of matter forming, rub the udder with a liniment of equal parts of goose oil and hot drops. If painful, wash with weak lye. It is very important always afterwards to milk very clean. Avoid high or stimulating food.

HOVEN—occasioned by eating too much fresh clover or other green food. The preventive is caution in turning into fresh pastures, allowing but a short time at first. In mild cases, a cure may be effected by a quart of saleratus water; in severe and threatening ones, a penknife must be thrust into the paunch through the skin, two or three inches forward of the hip bone.

FOUL IN THE FOOT—caused by standing long in filth—may be cured by removing to a dry clean place, washing with soap, then with chloride of lime, and applying curriers' oil. Washing with salt and water is useful.

LICE.—Wash the skin, night and morning, with a decoction of 2 ounces of lobelia seeds in 1 quart of boiling water; after standing 2 hours, apply with a sponge.

SORE TEATS.—Always wash with *water* before milking, or after calf-suck-

ing—this is often sufficient. If much sore, apply equal parts of lime-water and linseed oil.

CHOKED CATTLE—may be relieved, when the obstruction is high, by thrusting the arm at full length down and seizing it with the fingers. To prevent the animal biting dangerously, pass the arm through a wheel-box or clevis, held firmly in the mouth; or still better, through a wooden box made on purpose, with projecting ends to hold by. If far down, the obstruction may be pushed down with a flexible stick with a round soft knob.

TO PREVENT A COW SUCKING HERSELF.—Thrust a hickory stick, 8 inches long, and half an inch in diameter, through a slit made in the nose, so that the stick may project each way horizontally. If the stick is a little smaller at the center, it will not come out.

COLIC.—Inflammation of the bowels and diarrhœa require nearly the same treatment as with horses.

SHEEP—SCOURS.—Give 4 ounces raw linseed oil mixed with two ounces of lime-water, when the disease first appears, and give half a gill of ginger tea every four hours, and mix ginger with the food. Feed on gruel or mashes of meal. A drink of slipperry-elm is valuable. When approaching dysentery, give a teaspoonful of charcoal additionally.

STRETCHES OR CONSTIPATION.—Give fresh air and exercise, and scalded shorts. Chopped roots are excellent.

FOR LOSS OF APPETITE.—Give camomile tea.

TO DESTROY TICKS.—Drop on a tincture of lobelia seeds, a few drops only.

FOOT ROT.—Mix about one part of sulphur with twenty parts of salt, or thereabouts, and feed the sheep regularly with it the season through. In flocks of 2,000 sheep, badly infected, it reduced the disease to one-thirtieth in a single year, and afterwards entirely eradicated it. Flour sulphur may be bought very cheap at wholesale in any city.

ROT.—Give 2 ounces powdered charcoal and 1 ounce of ginger, mixed in a pound of oatmeal.

STAGGERS.—If too poorly fed, feed higher; if too high, reduce. Dr. Dadd's remedy is to give half a teaspoonful daily, mixed in food, of slippery-elm powder 4 parts, powdered snake-root 2 parts, and 1 part of fennel seed.

As a general medicine, for all diseases affecting the digestive functions, a mixture of charcoal and salt is recommended.

SWINE—FITS.—Give a clean, airy pen—feed carefully and *moderately*, with a little horse-radish in the food, and give plentifully of valerian tea.

MEASLES.—Usually known by its eruptions, with dullness or drowsiness. Remove to a warm and separate place, keep on thin gruel, give a teaspoonful of sulphur daily, and a drink of bittersweet tea.

VERMIN.—Mix sulphur and powdered charcoal with the food, and wash the skin in wood-ash lye, and then in a decoction of tobacco.

DIARRHŒA.—Apply the same remedy as for sheep.

ANIMALS—TETHERING AND SECURING.—All who are familiar with animals well know that the practice of jumping fences is an acquired habit, although in a few cases it may be hereditary. But this is a matter of small consequence. We know that animals do leap fences, and how to prevent it is the question.

First we give an engraving of an improved form of clog or tether (fig. 3) and the same is made by connecting, with a chain or rope one foot in length, two round pieces of wood, each twelve inches in length and half the size in diameter.

Fig. 3.
Clog or Tether.

The center of the chain or rope is connected with the leg by a short chain, and a strap encircles the fetlock. The object of this arrangement is to be able to turn horses in a large pasture at noon, or at any time, and prevent them from walking about, or far from the point at which it is desired they should remain.

Another arrangement, necessitating slow walking, is the use of knee-hopples as shown in figures 4 and 5. A leather strap (a harness hame strap will answer) encircles each leg above the knee joint, and these are connected by a chain from three to five inches in length. This plan does not strain the animal; is cheap, easily attached, and effective.

Fig. 4.

Fig. 5.

Another cheap and effective pair of iron hopples, is made in the form of the annexed fig. 5. The effective pair of iron hopples is made in the form shown in fig. 6. The part or band encircling the fetlock is of the usual form; one end is closed, and retains an iron ring about an inch in diameter; the other is left open about one-quarter of an inch, into which, when the band encircles the fetlock, is hooked the ring *B*, the thin and peculiar shape at *R* allowing it to be readily attached. The ring being long, with inserting part at the side, keeps it from unhooking while in use. The entire length of chain should be about two feet six inches. A blacksmith will charge from $1.50 to $2 for making them.

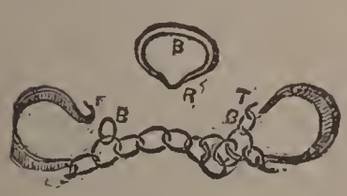


Fig. 6. Iron Hopples.

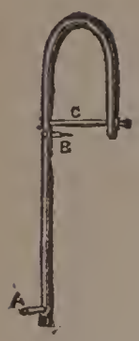


Fig. 7—Sin. Pend. Poke.

SINGLE PENDENT POKE.—A poke of this form is simple in construction, easily made, and explained in fig. 7. When made light and of suitable length, it can be placed upon colts one year old, or over, with good results, and without the usual straining effects caused by the use of fetters. It is secured about the neck by an iron bolt C, with nut attached; or with a strap, or by a wooden pin made like a bolt, with leather or iron key. A horse-shoe nail is a good key, and is easily bent by hand. A pin of wood or iron is driven in near the bottom, and projects outward about three inches. This catches into the fence when the colt attempts to leap over. In the pendent, and two inches below the bolt *C*, and at right angles thereto, is inserted a wooden pin, *B*, $\frac{3}{4}$ of an inch in diameter, and projecting 3 inches, into the end of which a nail is partly driven, and then filed sharp. When the poke is pressed hard against the fence the nail enters the breast, and another attempt is not made very soon. When the animal stands in an upright position the bottom of the poke should not come nearer than 12 inches from the ground.

DOUBLE PENDENT POKE.—We give in the following engravings, two forms of the double pendent poke, that with both pendents parallel is only an extension of the short arm of the bow of the single pendent, and may be made in the same manner with catch pins, etc. The great advantage is that the weight is distributed more evenly upon the neck, and offers more impediment to the jumper than the former. The dotted lines *D. D.*, show another form of arrangement. It may be bent inward at the point of bolt fastening, then diverging outward, or diverging only below the bolt as desired. This plan offers more convenience to the animal while walking or feeding, and is not liable to injure the knees when moving rapidly. If made from a round stick, unless of quite uniform diameter, the large end should be reduced in size.

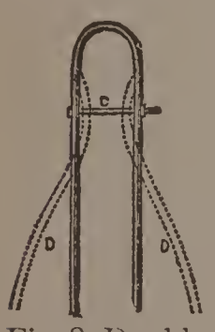


Fig. 8. Double Pendent Poke

Fig. 9. Bow and Flexible Projection.

FLEXIBLE PROJECTION POKE.—As regards cheapness, this poke (fig. 9) compares favorably with either of the two just described, and for effectiveness we think that in many respects it is preferable.

In most sections of the country farmers have old ox-bows, or can obtain them of a neighbor at slight expense, and they will be found just the thing for this purpose, with the exception, perhaps, of the ends in some cases being too far apart, which is remedied by tying firmly together and immersing it for half an hour in a tub or boiler of hot water, and then allowing it to dry for a day. After removing the fastening, the ends should touch, or at least be

within an inch or two; and in use is readily sprung over the horse's neck. An iron bolt passes through the upper end of projection *O*, and through the bow within five inches of the end. About four inches below, the bolt is firmly driven an iron rod, *N*, one-half inch in diameter and seven inches in length, the ends of which set against the bow, keeping the projection at an angle of about 45°. This poke is readily attached, and the bow will not be lost if the remainder is. We have known extremely tricky animals, by a side movement, to throw the end of the projection over the fence, and then leap over with apparent ease, but such cases are as rare as they are provoking.

BENDING BOWS, ETC.—To obtain a desirable, uniform curve in bending bows, a machine or form should be used, and a simple arrangement for the purpose is shown in fig. 10. The ends *B* are made from plank fifteen to eighteen inches wide, shaped in the form of an arch, with projections at each side 7 inches long and 4 wide, through which are made holes, 1 inch in diameter, in which loosely fit the retaining bars of wood *A A*. Over the arched partition are nailed strips of boards 12 inches in length, 2 inches wide and one inch thick, and 2 inches apart.

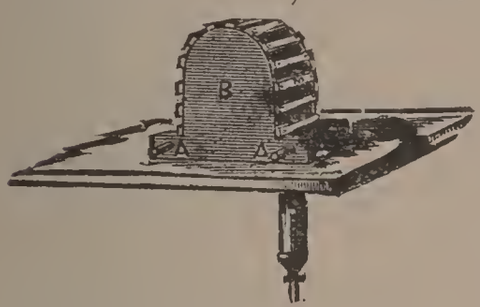


Fig. 10.
Machine for Bending Bows.

In fig. 11 is shown an end view of bending machine, with stick *E* in process of bending. It is frequently desirable to bend dry and seasoned wood. In this case cut it into the desired shape, and either steam for a few hours, or immerse in water for a day or two, until thoroughly soaked, when no difficulty should be experienced in bending. If you form the bow too small, the animal wearing it is inconvenienced, if not distressed thereby; if on the other hand too large, you have your remedy by winding with strips of flannel cloth, firmly tied in place. Always, and in every case, bend with the cut side inward, which in a measure prevents splintering. It is not necessarily required that any particular kind of wood should be used—any tough, firm, easily bent wood will answer. If a round stick be used, remove the bark and all projecting knots, and make as smooth as possible, rendering it more convenient to handle, not so liable to wear the hair and mane, or cause irritation. It also seasons more rapidly, and is not so frequently worm-eaten.

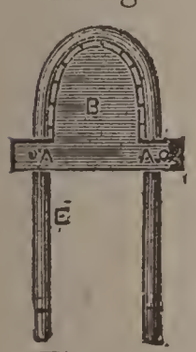


Fig. 11.
End View of Bending Machine Holding a Bow.

UNIVERSAL FETTERS.—The illustration shown in connection with this article, represents a style of fetters (fig. 12) that every farmer will find to be of great practical utility. They are made of different sizes, to fit the size and kind of animal to be hoppled. When on the farm, we found this kind of fetters of excel-

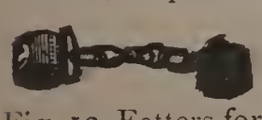


Fig. 12, Fetters for a Kicking Cow.

lent service; and those who are in doubt about the utility of employing them for sheep or neat cattle, may rest assured that they are valuable, and worthy of general introduction.

When we kept a bull, his fore legs were usually fettered when he was turned into the field. The chief object of the fetters was to prevent coupling with any cows, or heifers, which we desired to keep from the male. When the services of the animal were required, the fetters were removed from one, or both legs.

It will be perceived, that if a bull's fore legs be connected with a chain one foot long, it is utterly impossible for the cow to receive him. And the same is true of rams. If their fore legs be connected with fetters, so as to allow them six or eight inches play, rams and ewes may run together always, and no lambs will be dropped at an untimely season of the year. When a farmer has but one ram, by putting fetters on his fore legs, he will find it much more convenient, and better for the ram also, to allow him to run with the flock, than to be confined alone in a small enclosure.

There should be a swivel in the chain to prevent twisting into kinks, as the animal will sometimes throw his feet over the chain as he walks. The pieces of leather that buckle around the fore legs should be strong and broad; and the buckles, two or three on each piece, should be secured to separate pieces of leather sewed firmly to the outside of the large pieces of leather. The end links of the chain should be made like a cock-eye for traces of harness.

ANIMALS—Draft, training.—This cannot be commenced too early, at first by acts of kindness, by which they become tractable and confident, and all feeling of fear is dispelled.

Colts and steers should be halter broken and yoked the first winter, and constantly handled, and this practice should never be discontinued. They must not, however, be worked hard while young, for many obvious reasons, but it is important that the training be done thoroughly, in which the art of backing is too much lost sight of. A well trained, orderly pair of cattle or horses, will always command nearly double the price of ordinary animals.

ANIMALS—Chaff in eyes.—Cattle that eat straw from a stack, or thrust their heads into large piles of straw, sometimes get barley beards or oat chaff into their eyes, inflaming and shutting the eye, causing the flow of water from it, and sometimes producing blindness. S. E. Todd states, in the Ohio *Farmer*, that after trying for a cow partly blinded with oat chaff, the various remedies generally prescribed, including powdered burnt alum blown into the eye, the use of honey, etc., to no purpose, he found the best remedy, and one entirely effectual, was to take a silk pocket handkerchief, draw it tightly over the end of the finger, and after having raised the lid as

much as practicable, thrust the covered finger into the eye. The chaff adhered to it, and was at once brought out. He has always succeeded with this remedy. If the finger is not large, it may be passed all around the ball. The animal, if not gentle, will require tying.

ANIMALS—FLIES, REPELLING FROM.—A writer in an agricultural paper pours two pails (24 quarts) of boiling water on five pounds each of walnut and tobacco leaves (refuse tobacco,) and washes his horses, oxen and cows with this decoction—when dry, he rubs his horses down with walnut leaves. He affirms this will repel flies for two weeks (if not washed off by rains, we suppose.) A decoction of wormwood is said to have the same effect—and probably many other plants would be equally efficacious.

ANIMALS—WARTS ON.—A correspondent of the Germantown *Telegraph* says that bathing the wart two or three times a week with turpentine and sweet oil mixed, will certainly effect a cure.

ANIMALS IN WINTER.—Farmers do not sufficiently sub-divide their yards in winter. Large and small animals are turned in promiscuously together, and as every farmer knows, the larger ones are very ferocious and domineering towards those much inferior, but careful not to provoke the wrath of such as are nearly equal. Turn those together which are of similar size, and they will be more quiet all round. Calves generally are too much neglected, and come out small and puny in spring. A good manager has constructed a spacious stable for calves in one of his sheds, moderately lighted, and well sheltered from all currents of wind. This apartment is kept clean, the calves fed on good hay, and supplied with good water. They present a very different appearance from other calves in spring.

CATTLE, AGE OF—HOW TO TELL.—(*By the teeth.*) The calf is usually born with two fore or cutting teeth, and in one month the entire eight are out. The age is then guessed by the wearing down of these teeth until the calf is eight months old, when they begin to grow narrower and smaller. At eight months the two centre teeth have become smaller than the rest; and from that time until eighteen months old the others gradually diminish, until they are all considerably lessened in size and stand apart from each other. At two years old the two middle teeth are pushed out, and succeeded by two permanent ones; at three there are four permanent teeth; six at four years, and all the rest at five, when the animal is said to be full-mouthed· but he is not actually so until six years old, when all the eight are level.

A competent judge of cattle will generally determine the age with considerable accuracy for many years after that. From six to nine he will be guided by the wearing down of the teeth, and after that by the diminution in their bulk, as in the milk teeth. At nine the two middle fore teeth are smaller and narrower than the rest; at ten the next two are so; and so on

until twelve, when, as in the steer of two years old, the teeth again begin to stand apart from each other.

(*By the horns.*) The surface of the horn continues nearly smooth until the expiration of the second year, when a wrinkle or circle of thicker horn begins to be formed around the base. This is fully completed in twelve months, and another ring then begins to appear, so that if the perfect rings or circles are counted, and two added to them, the age of the beast is supposed to be ascertained. These rings, however, are not clear and distinct, and it is very easy to remove one or two of them with a rasp, and deceive at least to the unpracticed eye, when the animal begins to be unmarketably old. In addition to this a well known fact should be stated, that if a heifer takes the bull at two years old, the first ring is formed a twelvemonth before its usual time, and, consequently, she would always appear to be, reckoning by her horns, a twelvemonth older than she really is.

After all, the age, as denoted by the horn, can only be calculated in the cow; these things do not appear in the ox or bull until the animal is five years old, and then they are generally too confused to be accurately counted.

CATTLE—Hooking.—Saw off with a fine sharp saw an inch or two of their horns. This is as good as brass rubles.

CATTLE—Feeding pumpkin seed to.—It is asserted by some good farmers, that pumpkin seed have a certain specific effect on cows, causing them to dry up their milk; and when the seeds are taken out before feeding, it will be found they yield a larger quantity.

CATTLE—Probang for choked.—The safest mode of removing potatoes or other obstructions in the throat of cattle, is with the hand, and this is particularly applicable to cases where the obstruction is in the upper part of the throat. When further down, a probang must be used. The great point is to have one with a *concave* end, so as to hold the potato in the middle of the throat. We have known a rounded or flat end of the piston to work itself between the potato and the side of the throat, and kill the animal. The following are suitable dimensions of a probang, made of hickory or tough white oak. It is three feet long, and an inch and a half thick—the concave at the piston end, and the handle at the other worked down to five-eighths of an inch between, so as to be flexible. Two men will hold the cow by the horns and nose, while a third with the instrument will very carefully and cautiously shove the potato down about half a foot, when it is carefully withdrawn. Cattle have been relieved and cured in less than a minute.

Fig. 13.—Probang for Choked Cattle.

When the obstruction is far down in the throat, it may be carefully pushed down by a flexible rod, coated on the end by a piece of pork-rind, tied

firmly on with a cord, the inner side outwards. When the obstruction is higher up in the throat, it may be removed by thrusting the arm down the throat and seizing it with the fingers. For this purpose the jaws must be held firmly wide open, to prevent all danger of biting. The annexed figure represents a simple instrument used for this purpose, which may be made in a few minutes, and should be always kept on hand by those who are not vigilant in excluding whole apples or potatoes from their animals. It consists of a strip of board made of hard wood, *a*, about two feet long and three inches wide, shaved or rounded at the ends so as to form handles. Two wooden blocks, *c*, *c*, are placed between this board and a similar board, *b*, so as to leave a hole or space just large enough for the hand and arm to pass through. These boards should be firmly nailed to the blocks. In using it a man stands on each side of the animal, and holds the horns, while the mouth is crowded open and the instrument held firmly by the handles. A third person, after removing his coat and rolling up his sleeves, thrusts his arm nearly full length down the throat and removes the obstruction. An active, half-grown boy. whose hand is smaller than that of a man's, usually succeeds best. The whole may be done in less than a minute's time—the writer has often performed this task without any inconvenience.

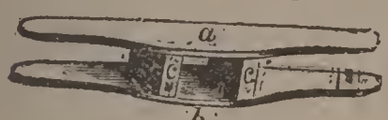


Fig. 14.

It is said that pouring into the throat half a pint, more or less, of sweet oil, or lamp oil, will so lubricate the obstruction, that rubbing the throat briskly outside with the hand will soon remove it—sliding it up or down according to its position. In any case oil is a useful auxiliary to other means.

CATTTE TIE.—The following is a design for a cheap, effective and simple cattle tie, which may be new to many readers. It is preferable to stanchions, as being more humane; while it is always out of the cattles' way, so that they cannot possibly get it fastened anywhere so as to break it. It is easily put on and off.

Fig. 15, View from above.

The leather of which the straps are made should be made wet and *stretched* before using; mine were not done so, and have become a little too long, which we correct by simply twisting one after the other has been put on the horn.

I use them on my oxen, which stand two in the same stall, upon a raised platform, just long enough for them to stand on, with a gutter behind them to save manure.

CATTLE—RACKS.—A western farmer who feeds 150 head of cattle, estimates that the construction of good feeding rack saves him at least five

tons of hay yearly—more than enough to pay annually for the racks. Judging from the amount of hay we have often seen trodden in the mud, or used as litter by the cattle, as many tons would be yearly saved by some who have not fifty head.

CATTLE—To make them thrive in winter.—There are certain requisites to be constantly observed, namely, the following:

1. To feed *regularly*, and prevent fretting for expected meals.
2. To give enough, but never over-feed.
3. To feed often, and moderately at a time.
4. To furnish constantly a supply of good water.
5. To shelter from storms.
6. To rub them clean, and give clean litter.
7. To give them a portion of carrots or beets daily.
8. To keep their stables properly ventilated and free from bad air.

CATTLE—Training to jump.—A Western farmer says he makes it a rule that whenever cattle are made to pass a fence, whether through bars or "slip-gap," to leave one rail for them to pass under. This gives them a downward tendency, and lessens their inclination to jump or look upwards, as they are sure to do when a lazy attendant throws down a part of the rails, and makes them vault the rest. Cattle may be taught to go over any fence, by the careful training they often get for this end, and performed as follows: First starve them, or give them poor food, which will make them light and restless. As soon as they go over the lowest part of the fence after better provender, make them jump back again, and put on one more rail, saying, "I guess that will keep 'em out." Next day, (as of course they will be in mischief again,) repeat the process, adding another rail; in a short time they will take care of themselves, and harvest the crops without charge.

CATTLE—Wintering.—Every farmer should reserve his best hay for the latter part of winter and spring. Let the animals rather improve instead of their falling away as warm weather advances. Let them enter the pasture in good condition. It is an old axiom, "cattle well wintered are half summered."

CATTLE—Wounds in.—Wounds in cattle are quickly cured by washing several times a day with a mixture of the yolk of eggs and spirits of turpentine.

CALVING—Time for heifers.—A late English writer considers it a matter of great importance, that heifers should be so managed as to have their first calf late in spring, when there is an abundance of succulent food, inducing a large supply of milk. This is much better than to have them come in early in spring, when they have dry food only. The habit at first

formed is apt to remain with them, and if they commence by giving a good supply of milk, they are apt to be good milkers afterwards.

COWS—MILCH, BEAN MEAL FOR.—We have on former occasions alluded to some trials that have been made in feeding milch cows with bean meal, the results of which seemed to show that it was a highly valuable article. At a late meeting of an English Farmers' Club it was stated by a member, that nothing was so good for cows in milk, either as regarded the produce of butter or cheese, as bean meal.

COWS—FEEDING SQUASHES TO.—A correspondent of the *Country Gentleman* found that his cows gave four quarts of milk more per day, with the seeds taken out, than when left in—three pecks being daily fed to two cows. Another cow fattened more rapidly on three pecks of squashes cut into small pieces, than on six quarts of scalded cob-meal. The squashes made more milk and butter when the seeds were taken out than carrots; and about the same when the seeds were left in. The variety was the Boston Marrow, with some Hubbard, both very rich kinds. The cross was thought to be better for the purpose, and to keep longer than the Marrow alone.

COWS—TO WINTER VILLAGE.—One hundred bushels of carrots may be raised on ten square rods of *very rich ground* in favorable seasons, and in almost any season on sixteen square rods, or four rods square, one-tenth of an acre. They will keep a cow all winter in the finest condition, in connection with some hay, and furnish rich milk and butter. A few square rods of sorghum will supply fodder nearly all the autumn, of the richest character, but should be cut short in a stalk-cutter.

COWS—FOOD FOR MILCH.—Cornstalks sown thickly for fodder, harvested, well cured, and kept from fermenting, are probably the cheapest kind of fodder that can be raised for cattle—unless sorghum raised for this purpose should prove by experience to be better. In addition to this, give each animal daily a peck to a half-bushel of carrots, or an equal amount of sugar beets, the winter through. It does not pay to cook them. A small quantity of corn or bean meal, or both, in addition to this, will have a good effect, but not more than two quarts should be given daily, at the utmost.

COWS—TO CURE KICKING.—1. Never allow the slightest degree of heat or passion, or departure from perfect self-control.

2. Never strike the animal but once at a time—no matter what the provocation may be—a single, sharp cut with a switch (kept under the left arm,) excites fear and alarm—two or more strokes create a re-action, and cause rage but not fear.

3. Adhere faithfully to the principles of cause and effect, and the animal will quickly understand these principles, if the single, alarming stroke always instantaneously follows *every* attempt to kick.

4. Treat the animal in a firm, soothing, gentle manner at all times—only let the blow always come quickly after every kick; whether it be merely an *abortive attempt*, or the whole pail of milk is upset—the *intention* of the animal was the same.

We do not wonder that so many fine cows are spoiled, that are treated according to passion and caprice, and not according to principle nor rule. If a cow kicks maliciously, but happens to hit no one, the milker takes no notice of it; if a mere accidental movement of the foot oversets a pail of milk, a shower of furious blows follows, and it becomes impossible for any brute to know from such irregular practice, what connection there is between the punishment and the offence.

COWS—Rules for managing.—Never buy a cow of a dairyman, for if he is a good manager he will sell only his poor animals.

To determine which cows are best for keeping, try their milk separately, and weigh the butter—for sometimes a cow may give much milk and little butter, and *vice versa*.

Cows should run dry six weeks before calving—if milked closely towards calving, the calves will be poorer.

A cow newly come in, should not drink cold water in cold weather, but moderately warm slop. Calves intended for raising, should be taken from the cow within a few days, and they will be less liable to suck when old. Feed them first with new milk for a time—then skim milk—then sour milk—taking care that all changes are gradual, by adding only a portion first, and add gradually a little meal.

Calves well fed and taken care of, with a quart or two of meal daily in winter, will be double the size at two years they would have attained by common treatment.

Heifers thus treated may come in at two years old, and will be better than neglected animals at three, and one year of feeding saved.

Hearty eaters are desirable for cows, and they may usually be selected while calves. A dainty calf will be a dainty cow.

Heifers should be accustomed to be freely handled before calving, and drawing the teats. They will then not be difficult to milk. Begin gradually, and never startle them.

In milking cows, divide the time as nearly as practicable between morning and evening, especially at time of early grass, that the udder may not suffer.

Persons who milk should keep the nails cut short—animals are sometimes hurt with sharp nails, and unjustly charged with restlessness.

Old cows should be fatted at fifteen years. The dairyman, therefore, who has fifteen cows, should raise a heifer calf every year to supply the vacancy—if the herd is thirty cows, he should raise two calves, and so forth.

Heifers dried up too early after calving, will always run dry about the same time in after years—therefore, be careful to milk closely the first year, until about six weeks before calving.

Spring cows should come in while they are yet fed on hay, and before they are turned to grass, which will be more likely to prevent caked bag and milk fever.

COWS—GARGET OR INFLAMED UDDER IN.—It is stated on good authority, that whenever this disease is caused by a cold, a few drops of *aconite* in solution, will soon effect a cure. It is dropped into water, and a piece of bread then soaked in it, and applied.

COWS—STABLING.—Different experiments show that stabling milch cows during an average of Northern winters, increases their milk about *one-third*. In very severe weather the milk will be doubled; while in mild days less advantage results.

COWS SUCKING THEMSELVES.—The following contrivance, not entirely new, is described by A. D. Newell of New-Brunswick: "I took an oak barrel head and cut it in this shape, (fig. 17,) five inches wide and eight inches long; I then sprung or bent her nose so as to get a point in each nostril; it then hung in front of her mouth. She can eat anything, but not suck. I have put small ones on calves, so that they can run in the fields with their dams, and not be able to suck them."

Fig. 16.

Fig. 17.

COCK—CHOICE OF A.—He should be vigorous, broad in the breast, clean in the legs, with ample wings, and a well developed tail plumage; his eyes should be bright, and the caruncled skin of the neck full, and rapid in its changes of color. Though capable of assuming his legitimate rank among the hens when a year old, he is not in perfection until he has attained his third year and is entering upon his fourth, and he continues in his prime for three or four years. Thus for two, three or four years, or longer, may all the young cocks be devoted to the spit, one, perhaps, of particular beauty being preserved within that space of time for the adornment of the farm-yard.

FOWLS—FATTENING.—If it is desired to fatten fowls in a very short time, they should be confined in small coops. Some writers think it better to make half of the floor a little inclined, and cover it with boards. Troughs for feed and water should be fastened around the edge of the coop, and the whole placed in an out-building, as a barn or shed, away from other fowls. For the first twenty-four hours give water, but no food. On the second day commence feeding regularly three times daily with the most nutritious food, such as oatmeal mixed with milk, boiled wheat, etc., etc.

The troughs should be cleaned daily, and plently of fresh clean water given and the fowls must be fed very early in the morning, and all they will eat at all times. In from fourteen to twenty days they will be in their best condition, when they should be killed, for if kept longer they soon become diseased.

Poultry may be fattened quicker and more perfectly by stuffing, but it is an unnatural as well as an inhuman way.

Dorking, Spanish, Game, Hamburgh and Polish chickens hatched the last of May, will do well to fatten when three months old, but Shanghai, Malay and Java chickens should be at least a month older.

FOWLS—HENS TO MAKE LAY IN WINTER.—Provide,

1. A comfortable roost.
2. Plenty of sand, gravel and ashes, dry, to play in.
3. A box of lime.
4. Boiled meat, chopped fine, every two or three days.
5. Corn and oats, best if boiled tender.
6. All the crumbs and potato pearings.
7. Water, not cold, or blood warm.

This treatment has proved quite successful, and hens which, without it, gave no eggs, with it immediately laid one each on an average, every two days.

HENS—TO PREVENT EATING EGGS.—S. E. Todd succeeds well by the following mode:—Empty nail kegs (large enough to hold 100 lbs. of nails) are sawed in two, and each half makes a hen's nest. The heads are knocked out, and a piece of cloth nailed on for a bottom. These are nailed about 4 feet above the floor. Hens on these nests are hid from below, and will not be molested or robbed; and they cannot reach their own eggs while standing on the edge—and while on the nest there is not room to get at them.

HENS—NEST-EGGS.—Nest-eggs are frequently made as follows: Take an egg and break a small hole in the round end of it, and remove the contents; next fill up the shell with plaster of Paris, wet up with water to such a consistency as to admit of its being poured into the shell; after it "sets," paste a piece of white paper smoothly over the hole. If this is not done the hens peck at the end of the egg and soon destroy it. This kind of nest-egg is cheap and easily made, and they will last a long time.

Porcelain eggs are sometimes hard to find just when you want them, and besides, they are often made so thin as to be easily broken, which is the great objection to their use.

HOGS—FATTENING IN WARM AND COLD WEATHER.—A correspondent of the Ohio *Farmer*, writing from Duncan's Falls, gives an account of an

experiment made with one hundred hogs, averaging two hundred pounds each, and placed in nine large covered pens, with plank floors and troughs. They were fed as follows:

"The corn was ground up cob and all, in one of the "Little Giant" steam mills; steamed and fed at 6 and 9 A. M., 12 M., 3 and 6 P. M., or five times a day, all they could eat, and in exactly one week they were weighed again, the corn they had eaten having been weighed also, and calling 70 lbs. a bushel, and pork as before (four cents gross,) it was equal to eighty cents per bushel for corn. The weather was quite warm here for the season of the year. The first week in November I tried the same experiment on the same lot of hogs, and the corn only brought sixty-two cents per bushel, the weather being colder. The third week, same month, with same lot of hogs, corn brought forty cents, and the weather still getting colder. The fourth week, same as above, corn brought twenty-six cents: weather still colder."

This lot of hogs were sold off the last of November, and another lot of hogs put up, which had been fed in the field on corn in the cob.

"This lot was weighed and fed as above, the five weeks of December, and the corn fed averaged twenty-six cents a bushel, the weather being about the same as the last. This lot was tried again in the middle of January, the corn fed for that week averaging only five cents per bushel; at that time the thermometer stood at zero. This same lot was tried again and just held their own, the thermometer being below zero, sometimes as low as ten degrees."

From these facts the writer comes to the sound conclusion that "it will not pay, as a general thing, to feed corn to hogs after the middle of November," unless the price is very low. It will not pay to find fuel in the shape of corn, to keep hogs or other stock warm in winter. We should either fatten early, or provide comfortable shelter and accommodations for our swine, etc.

HOGS—BOARD FLOORS FOR.—A well known hog raiser says: "Having had much experience in rearing and fattening swine, I can state confidently that hogs will thrive on a board floor, if properly taken care of. Their feet do sometimes become distorted, but seldom so much so as to interfere with their thrift. Such floors are preferably made of laths or rails laid at such a distance apart as to allow the urine to pass freely through. I know of no mode in which hogs can be kept so clean and comfortable as on such a floor in the summer season; in winter a tight floor is necessary for young pigs."

HOGS—PARSNIPS FOR.—Parsnips appear to be nearly the only root good for swine in an uncooked state. Turn a herd of swine into a field

containing field beets, ruta bagas, carrots, and parsnips, and the questiont will very soon be settled which they like best, and which, consequently, is best for them—the parsnips being wholely devoured before the others are touched.

THE FORM OF A GOOD PIG.—The aim of all breeders of animals designed solely for meat, is to have the body approximate as closely as possible to the form of a parallelopiped. In proportion to the size, an animal of this form contains the greatest weight. Hence it is, that farmers who have kept nothing but common pigs, and who look upon a well-formed, grade Essex or Suffolk as "small," are surprised to find, when brought to the scales, that it weighs more than an old-fashioned, ill-formed pig of much greater apparent size.

Another advantage of this form is, that it gives a greater proportion of the most desirable parts of the pig.

In a pig of this form the ribs are well-arched. We cannot have a flat, broad, "table-back" without this. And consequently the muscle which runs along each side of the vertebræ, is well developed, and we have a large quantity of meat of the best quality.

PIG—HOW TO SELECT.—This form also affords abundant room for the lungs, stomach, and intestines; and it is on the capacity of these organs to convert a large amount of comparatively cheap food into a large quantity of flesh and fat that determines the value of the animal.

We annex a portrait of a tolerably well-formed pig, with lines showing how to apply the test above alluded to. The nearer he will fill the rectangular frame, the nearer he approaches to perfection of form. It would be well for farmers to place a straight cane along the back, also along the sides, shoulders and hams of their pigs, and see how near they come up to the desired standard.

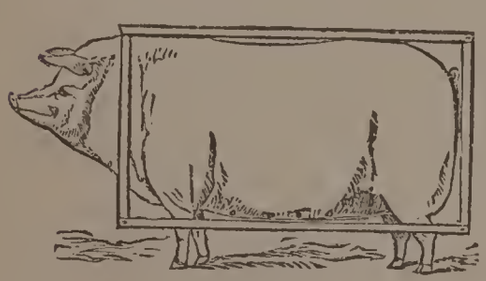


Fig. 18—Testing the form of a pig.

The length of a pig should bear a certain proportion to his breadth. Many farmers object to the improved breeds because they are too short. In point of fact, however, they are often longer than their ill-bred favorites. They appear short, because they are so broad. A large-boned hog is longer than one having small bones. There are as many vertebræ in the shortest Suffolk as in the longest Yorkshire.

A fine-boned pig cannot be long-bodied. It may appear long, but this will usually be because it is narrow. Breadth and depth are of far greater importance than length.

In a common sow, to be crossed with a thorough-bred boar, length of body is often very desirable; but in a thorough-bred pig it is a doubtful quality, as indicating a want of breadth and fineness of bone.

The head of a pig should be set close to the shoulders. The broader and deeper the cheeks the better, as next to the ham and shoulder there is no choicer meat on the pig. A well-cooked cheek of bacon, with roast chicken, is a dish for an epicure.

The snout should be short and delicate, and the ears small and fine. A thick, heavy, pendant ear is an indication of coarseness, and is never desirable in a thorough-bred pig. It should be small, fine, soft and silky. It should be well set on the head, and lean a little forward, but not fall over. An ear that is upright indicates an unquiet disposition.

SOWS—With young pigs.—treatment of.—A correspondent of the *Maine Farmer*, who has had thirty years successful experience in raising pigs, says:

The hog goes with young sixteen weeks. They seldom vary twenty-four hours from that time. The feed should be gradually increased as much as eight weeks before they bring forth. For two days after, she should have no food except a little thin warm gruel, not to exceed half a pint a day of meal. She should have all the warm water she will take, which will sometimes be two pailfuls in a day. This is very essential, as it helps the flow of milk and prevents fever. You may now gradually increase the food till the pigs are two weeks old, when she should be full fed. If you have no better feed, good Indian meal, mixed with milk, will do very well, if you give enough and feed regularly. The pigs should be taught to eat with their mother as young as two weeks, which may be done by having a broad shallow trough, and gently putting them into it when the mother is eating.

SWINE—Fed on skim-milk.—*The Country Gentleman* published, a few years since, a statement of the successful feeding and fattening of swine on skim-milk, as practiced by Joseph Greene, of Macedon, N. Y., a mode, however, not entirely new. He fed spring pigs through the summer, and when six or seven months old, they usually averaged about 300 pounds each. Three, at seven months, weighed in one instance, after being dressed, no less than 956 pounds in the aggregate. Another animal, at six months and ten days, weighed when dressed 298 pounds. He ascribes his success to feeding undiluted milk, or in its most concentrated state, without any water thrown in. This made them grow rapidly, with solid square bodies, and not like the flabby animals produced when much liquid and little nourishment are given. The fattening was completed on the ground meal of old corn. They did not thrive well on new corn, and failed on "nubbins."

Several others have adopted a similar mode of treatment, with like success. One instance that has recently come to hand, is the following, reported in a late number of the Union Springs *Herald*:

"David Anthony killed, on Saturday last, a litter of eight spring pigs,

about eight and a half months old, the total weight of which were 2,350 pounds—an average of 293 pounds each—the slightest one weighing 280, and the heaviest 320 pounds. We call that hard to beat. If any one can do it, send on the figures."

On inquiring personally of David Anthony as to the mode of feeding adopted, he informs us that these animals are chiefly indebted for their rapid growth to the skim-milk that he gave them, of which he had a plentiful supply. He finished feeding them on fifteen bushels of ground Canada corn, which was all the grain he gave them. He intends to plant a few acres of the Canada corn, for fattening his swine another year, as it is fully ripe before the first day of autumn, and it is therefore found to be nearly equal to old corn for fall feeding.

COLTS—To PREVENT GNAWING REINS.—Wash the reins in alcohol, in which aloes and assafœtida have been dissolved. One trial will usually effect a cure. The same result has been produced where a few seeds of red pepper have been thrust into small incisions in leather, left purposely within their reach.

HORSES—DRAWING ON THE HALTER.—Various contrivances have been made to prevent horses from pulling at the post; some of these contrivances, by producing pain and subsequent soreness on the top of the head, effect permanent injury to the animal. A better plan is to use the following (figure 19) which by pinching the jaw, and pressing the mouth closely together, is very apt to compel the animal instantly to desist. Instead of connecting the two side rings of a common halter by a third strap to which the long strap is fastened, let these side rings be connected by a strong, flexible cord, as shown in the engraving, and fasten the hitching-strap to the outer part. Whenever the horse pulls at his halter the inner part of the cord is drawn forcibly against his jaw, and the powerful tourniquet movement is rather more severe than the animal is willing voluntarily to endure. A strap is sometimes used instead of a cord, but it is less decisive and efficient.

Fig. 19.—A strap for pulling horses.

HORSES—BALKY.—They refuse to move forward, with a dogged obstinacy, and seem to say, "I would rather go backward—I shan't stir forward a step." Take them at their word; hitch a team to the back end of the wagon, and start up in the opposite direction, drawing the balky animal in the way of his choice. He will soon regard it as a poor joke, and prefer going ahead in the natural way.

HORSES—CUTTING FEED FOR.—An accurate farmer has furnished the

Country Gentleman a statement of his experiments with feeding cut feed and meal to his horses, accompanied with weighing and measuring. He cuts oat straw about an inch long, with a rawhide cylinder machine, and this chopped straw is then treated with corn meal and bran, mixed in about equal quantities as to weight, so that each horse has about a bushel of cut feed, and three quarts of the meal and bran, twice each day. Sometimes hay is cut instead of oat straw, or both are mixed. It is found that two hundred pounds per week of this mixture of corn meal and bran, added to the cut feed, will keep a pair of working horses in the best condition. This he is satisfied from experiment is *less than two-thirds the cost of keeping them on uncut dry hay and whole grain.* The corn meal alone is not so good for horses, as when diluted with bran. An excellent meal is made of ground oats. The fodder is cut by horse power on stormy or spare days, and stored in large bins, so as to furnish always a surplus on hand.

HORSES—Bruising oats for.—The fact that oats are frequently undigested, and pass through the horse without change, should be sufficient to show the importance of bruising—for certainly no benefit can be derived from that which is undigested by the animal. Experiments made by the London Omnibus Company and others, show that a smaller quantity is required to produce the same ability to work, when the oats are bruised, than when fed whole.

HORSES—How to learn to canter.—To teach them a slow and easy canter, under the saddle, ride them long distances up hill.

HORSES—Breaking halters.—It is a serious fault for a horse to pull at his halter. An animal of this character was tied to a stake on the bank of a stream, with his tail towards the water. He snapped the halter, tumbled over the bank, floundered in the water to his heart's content, and afterwards was willing to remain "*at his post.*"

HORSES—Heaves in.—Well cured corn stalks, cut before frost, are the best fodder for horses that have the heaves. Cases taken in time, have been ultimately cured by constantly feeding on them. Hay, cut fine, and wet before feeding, will greatly alleviate all symptoms of heaves; and even in old and incurable cases, the disease will be often *suspended* while horses are thus fed.

HORSES—Over-reaching.—A writer in an agricultural paper, who is a blacksmith, cures over-reaching horses, and increases their trotting speed fifteen or twenty seconds per mile, by the following mode of shoeing, which increases the motion of the forward feet, and retards the motion of the hind ones. He makes the toe-caulks very low, standing a little under, and the shoes set as far backward as convenient, on the forward feet, with

high heel-caulks, so as to let them roll over as soon as possible. On the hind feet, the heel-caulk is low and the toe-caulk high and projecting forward. Horses shod thus, travel clean, and no click.

HORSES—Shying.—L. A. D., in the *Scientific American*, says that a horseman should never "shy" himself when the horse shies, nor show the least nervousness, nor notice it in the horse, and far less punish him for it, and adds: Allow me, having had a great deal of experience in managing horses, to add another bit of advice to nervous horsemen. Whenever they notice their horse directing his ears to any point whatever, or indicating the slightest disposition to become afraid, let them, instead of pulling the rein to bring the horse towards the object causing its nervousness, pull it on the other side. This will instantly divert the attention of the horse from the object exciting his suspicion, and in ninety-nine cases out of a hundred the horse will pay no more attention to the object, from which he will fly away if forcibly driven to it by pulling the wrong rein.

LAMBS—Fattening.—A correspondent of the Maine *Farmer*, says that lambs will soon learn to eat oats, if left before them, at about three weeks of age; and that it will cause them to grow and fatten rapidly, more so than by any feeding to the dams. Two boards are nailed together for a trough, and short boards nailed on the end, so as to raise them about six inches high; in this the oats are placed. The troughs are in a yard or barn, to which openings are made just large enough for the lambs to pass, but too small for the sheep.

LAMBS—Weaning.—Referring to this subject, W. H. Ladd, of Jefferson county, Ohio, (first rate authority on all sheep matters,) says: My practice is to turn the lambs in with their mothers, after they have been separated some twelve hours, and as soon as they nurse, separate them again; then after twenty-four hours, allow them to nurse once more. Since I have adopted this plan, I have never had an ewe's udder injured. Lambs should have a very little salt frequently when first weaned, as the herbage lacks the large proportion of salt which the mother's milk contains. But great care should be used not to give them much salt at once, or it will set them to purging; and if a lamb commences to purge soon after being taken from the mother, it seldom ever recovers from it.

SHEEP—Bringing out of winter.—The *Ohio Cultivator* gives the following mode of preparing for spring—the most difficult season for sheep. It is well to feed animals well on the approach of such a season, but it is still better, easier, and safer, to give them good and regular food, and good management all the year round.

Our lambs come from the 20th of April to the middle of May, and that the ewes may be strong, and have an abundance of milk, we commence

to feed a little bran and oats in March, and continue it until they get a sufficiency of grass. A ewe in good condition, and with a good flow of milk, seldom gives the keeper any trouble, but the reverse with the sheep, the reverse with trouble.

SHEEP—Shearing apparatus for.—An Ohio correspondent of the *Country Gentleman* furnishes that paper with the following:—Not having seen any notice of any improvement on the old-fashioned mode of shearing sheep,—no doubt as uncomfortable for the sheep as the shearer—I thought I would send you a sketch of one I have been using for the last three years, which I find to be just the thing. It was first made and used by a neighbor who has followed shearing many years. It has these advantages—the shearer stands up to his work, having both hands free; the sheep cannot injure itself by struggling, even if heavy with lamb, and you can shear faster and easier.

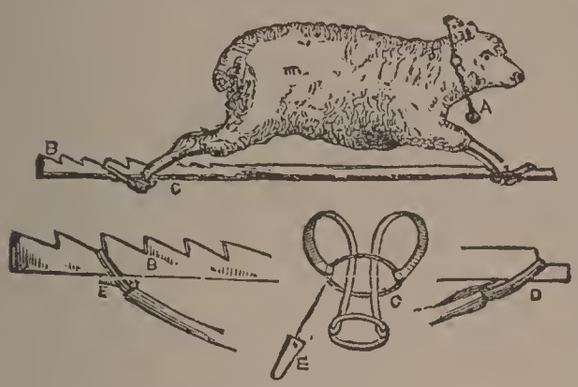


Fig. 20.

Description.—A. Small rope, with iron ring in the end, passes through two holes in the table, and over the sheep's head.

B. Hickory stick, 7 feet long, 2 inches wide at the notched end, notches 1½ or 2 inches apart, for adapting it to the size of the sheep.

C. Shackles, made of two leathern straps, one inch wide, fastened to each end of a small iron ring, 1½ or 2 inches in diameter, and passing and fastened to another ring 2 inches in diameter.

D. Forward end of stick B.

E. Wooden wedge, to fasten rings on the notched stick.

Mode of operation.—The sheep is caught, turned on its haunches, and the under part of the neck and between the fore legs are sheared; then lifted on the table or bench, the head placed under the rope, the leather shackles put on the feet, and stick inserted—as shown in the cut; one side is sheared and then the sheep is turned over, and finished. Hoping this may benefit some of my brother farmers, I submit it to your consideration.

It strikes us that any assistance in performing the laborious and disagreeable work of shearing sheep will be specially acceptable to the farmer, and we gladly give place to the above. A friend suggests an improvement, shown in Fig. 21, representing two leathern loops at each end of a stick, through which the feet are inserted; and as the legs are extended these loops draw tight and hold the sheep fast. A sliding ring, with a pin

Fig. 21.

and holes, accommodates it to the size of the sheep. Two leather straps (not shown) nailed to the table, and connected by a buckle in the middle, then receive the neck of the sheep, as in the mode described above.

SHEEP—CURE FOR FOOT ROT.—A correspondent says that the best and simplest remedy that he has tried consists in washing the feet perfectly clean, paring off the bad parts, and then dipping the foot for a few seconds into a small vessel of gas tar—a tin cup four inches deep, and three or four wide, will answer.

SHEEP—MARKING.—A writer in an agricultural paper gives the following directions: I first used turpentine, linseed oil, and lamp-black, stamping my initials on each sheep; in a few weeks not a mark was legible. I next tried boiling tar, keeping it hot by placing the vessel containing it in a kettle of coals. This was legible until the fleece was removed. I tried Venitian red and linseed oil, which soon became obliterated. Lastly I tried coal or gas tar, which makes a distinct and durable mark. Mark ewes on the side, wethers on the shoulder, and bucks on the rump. Sometimes stamp with my initial, cut in a block of soft wood; also use a stamp, cut in a circular form making a ring, and when in a hurry use the large end of a corn cob, making one, two or three spots near together. By marking sheep of different sexes on different parts of the body, it facilitates the assorting of a flock. Last spring marked all my breeding ewes with copper labels bearing a number stamped upon the face, suspended from the ear by a wire ring; but several of them are now missing, having been torn loose.

Another plan we give as follows: The plan of marking sheep may be said to be of numerous kinds—painting on the wool annually the owner's name; one to use the brush and stencil, and still another to put the letter on with a stamp. The stamp may be made in different ways. One is to cut the letters out of a piece of thin board of some kind of wood not easily split, or to cut them of stiff hard sole leather, and then to screw them on the end of a convenient handle, as shown in the cut, (fig. 22). A better and more substantial stamp may be made by a blacksmith, forming the letter and handle all in one piece of iron. Or the farmer may make his own stamp of a piece of small iron rod, either giving his initials, if they are of simple shaped letters, or bending the rod so as to make a circle, a triangle, or any other figure which he and others will understand

Fig. 22.

The paint used may be made of lamp-black and linseed oil—the former being previously mixed with a small quantity of turpentine, or, if preferred, red ochre may be used. Sometimes hog's lard is used instead of oil, which answers well if used in warm weather. The stamp is dipped in or touched to the paint, and a single pressure on the animal just after the fleece is

removed by shearing, fixes the name till the next shearing. Some sheep-owners put the letters on the shoulders, but as sheep usually stand in the pen with the back to the manager when they are selected from the flock, it is most convenient to mark them on the back or rump. The wethers may be lettered on the right side and the ewes on the left, which readily enables one to distinguish them; and if there are several rams, these may be marked on the top. An additional mark my be applied on the shoulder at the proper season, to designate the ram that has been employed.

The numbers and ages are shown by marks on the ear, and these should be made when the lambs are quite young, or a day or two old, when the dams are more readily known than after the lapse of some weeks. The numbering may be readily carried up to 1,000 or more. It is as follows:

Fig. 23.—One notch cut in the left ear, *at the top*, is 1.

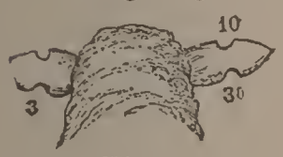


Fig. 23.

do. do. do, under side, 3.
do. do. right ear, at top, 10.
do. do. do. under side, 30.

A combination of these notches easily makes any number to 99.

Fig. 24.—One notch cut in the left ear, at the end, is 100.
do. do. right ear, at the end, 200.

Fig. 25.—The point of the left ear cut straight off is 400.
do. do. right ear do. 500.

The figures furnish examples of these markings, to which are added the holes punched through to show the age. As no owner would make a mistake of ten years in the age, these marks are much simpler:

Fig. 24.

Fig. 26.—One hole in the left ear is 1.
do. right ear, 3.

In order to explain more fully these different marks, the following references to the figures are added:

Fig. 25.

Fig. 23 is 1, 3, 10 and 30=44.
Fig. 24 is 100 and 200=300.
Fig. 25 is 400 and 500=900.
Fig. 26, giving the age, is 1 and 3=4; which means that the lamb came in 1864 or 1874, as the case may be—no hole indicating a year, as 1860 or 1870, a mistake ten years in the age not being possible.

Fig. 27 is an example showing a combination of these marks, as follows: —1 plus 30 plus 30 plus 100=161; and the lamb belonging to the year 1877.

Fig. 26.

The numbers being marked every year, and the age marked besides, there is no possibility of making any

mistake in a single individual. By a book register the number of the dam may be kept, the date or day of lambing, the ram, and any additional remarks.

Fig. 27.

The best marker is a saddler's spring punch, which may be used for cutting the notches by placing it at the edge of the ear; or for puncturing the holes in the middle. The holes should be about a fifth of an inch in diameter. If too small, they will grow up when the wound heals.

SHEEP—STRETCHES IN.—An eminent and skillful manager of sheep, says that he seldom fails to cure sheep of this disease in a few minutes, by placing a spoonful of tar in the mouth, and holding it shut till the tar melts and runs down. Lard and castor oil produce a slower and less certain effect.

SHEEP—WASHING.—A farmer who brook-washes his sheep till the water runs perfectly clear from the fleece, says his wool nets him in the market from six to eight cents per pound more than the imperfectly washed wool of his neighbors.

SHEEP—WINTERING.—The three great requisites for successfully wintering sheep are, 1st, good and regular water and food; 2d, good, clean shelter; and 3d, keep them in small flocks. The following is the method adopted by Robert J. Swan, of Geneva, N. Y., one of our best farmers:

I consider, for my fattening sheep, the best mode is to have good deep sheds (34 feet,) racks to receive their straw or hay, and troughs to feed their meal in, and keep the yards well littered with straw. We feed, to fattening sheep, two bushels of corn or two bushels of oil cake meal, to the hundred sheep, with plenty of good bright wheat straw three times a day, till the 1st of March, at which time we give them hay, in their racks, three times a day and one bushel of corn or oil meal per day per hundred. My store sheep we give plenty of bright oat or wheat straw in racks, three times a day, and one bushel of corn or oil cake meal per day per hundred, till the 1st of March, at which time I give them hay and no grain, but always take good care to see that all my stock yards are well littered with straw. My lambs I feed hay three times a day, and three pecks of oil meal or corn meal to the hundred. All the yards well supplied with water.

I never lose my sheep in winter, but more in summer, and those the fattest and the best—about two per cent. Judging from what I have noticed, on Mr. Johnston's farm, I think the fine wooled sheep less subject to disease than the coarser breeds. Where small flocks of coarse wooled sheep are kept, I think them healthier than those kept in larger, or in moderate sized flocks. Having been a pupil of Mr. Johnston, I adopted his course of farming, both in cultivating my farm, and fattening my sheep.

THE FARM—OR, HOW TO MAKE THE FARM PAY.

DOING WORK IN ITS SEASON.—A most important element for success in farming is doing every thing in its season. Delays not only cause confusion in the great system of operations, but many times, and we might say in the majority of cases, greatly increase labor as well as lessen the products of land. Taking the seasons into consideration, it becomes a matter of much importance to the farmer that brief memoranda of the labors of each month be laid before him, that he may perceive at a glance what points particularly demand his attention *at that time*. We therefore give each month separately, beginning with—

WORK FOR JANUARY.—Plans should now be made for the coming year. If not already accomplished, prepare to lay out the farm in regular fields, and introduce a good rotation—which will enable the farmer to carry on all his labor with the regularity of clock-work; to keep clean fields, to preserve their fertility, and to prevent confusion so often resulting from too much work for the force at particular periods.

There are a number of important points to which a good, skillful farmer should direct his attention before the spring work opens. He has now more spare time than then, if a farmer can be said to have any spare moments at any time during the year. One of the most important matters is to prepare *Farm Accounts* by procuring blank books and arranging the headings.

He should have a memorandum book, which he should always carry in his pocket so that he can note down at the time anything that occurs to him, and before the same is forgotten. Each and every field and crop should have a page devoted to it, and all outlays and profits should be carefully recorded. His farm should be well laid out, measured and mapped, which we think will be found a pleasant winter's task. And his granaries should be carefully measured and graduated, to show quickly the number of bushels of contents. A *scale for weighing his domestic animals* will pay for itself every year in the information it will afford him in relation to feeding. He should also keep correct accounts with all his neighbors, if he would avoid difficulties, and all his accounts, both with his fields and otherwise, should be a model of neatness, distinctness and systematic order.

Farm laborers should be hired in season, as the best are in demand and of course will all be engaged early, and it often happens that by paying a dollar or two more per month, a greater amount in valuable assistance will be secured, or in other words, the best are generally the cheapest.

Keep all barns and sheds clean and in order, and prevent the untidy accumulations and confusion which some premises witness. Keep all tools under shelter, provide a place for every thing, and let every thing be in its place; and do not allow hens to roost on wagons, horse-rakes, and carriages.

If cornstalks can be cut very short by horse-power, before feeding to cattle, a large amount of saving will be effected.

Let cattle and other animals be kept perfectly clean, comfortable, and sufficiently warm. If they occupy sheds, great care should be taken to prevent cold currents between the boards, and especially under the sills, and high fences or other screens should prevent all winds from blowing in the front side. If kept in stables, still greater care should be exercised to preserve cleanliness and to provide sufficient ventilation. Many denounce stables for cattle on account of the foul air and foul keeping they are subjected to; while others denounce sheds on account of the cold currents which sweep through them. Use the curry-comb freely and regularly on both cattle and horses.

Cellars under dwellings should be frequently examined and kept scrupulously clean; the walls may be whitewashed in the winter. Where there is danger of the ingress of frost at the windows, it is neater to provide double windows, (on hinges, to hook up,) than the more unsightly stuffings of straw, old carpets, and rags, etc.

POSTS CAN BE MADE at great profit during this month. We give engravings of frames to hold the posts, which is easily explained and understood. The post is wedged into the space *g* and the auger being inserted into the

two holes shown at the middle of the frame, it is driven through the post by turning the handle or wrench. Marks are made on the sliding frame, to show the precise place to bring the posts, so that all may be bored alike—the auger remaining fixed. Fig. 29 shows the bed piece for receiving the post on a larger scale. Fig. 30 exhibits the contrivance for securing the post firmly to its position for hewing or dressing with the axe—a cavity being made in a log for receiving it, with the iron point driven in to secure it.

Fig. 29.

An important improvement might probably be made in the boring frame by placing it in a slightly inclined position (as by shortening the legs on one side,) so that when a fly-wheel is attached to the auger, its weight would cause it to descend into the post. This fly-wheel might be a common grind-stone, in the absence of anything better, attached to the auger.

Fig. 30.

Rats and mice should be exterminated from all farm buildings. A few good cats are the best and most easily set traps. Rat-holes in cellars may be stopped by a mixture of hydraulic cement and broken bottles.

Sheep should be kept under sheds, and their fine condition maintained by a feeding of about half a pint of corn daily to each, giving less early in winter, and more towards spring. A small regular feeding of roots would assist in keeping up their excellent condition.

Corn keeps best on the cob. Shell such only as is needed for winter use. The second quality, or smaller ears, if kept in narrow, well ventilated cribs, will make good food for commencing the fattening of swine next autumn.

Snow on roofs, which often accumulates in eave-troughs, prevents the escape of rain or melting snow, and damming up, flows through the shingles and passes down through the house, should be timely scraped off, which may be done by the assistance of a ladder and a long-handled hoe.

Soot in chimneys should be burned or scraped out when the roof is wet, and thus prevent danger of fire by burning cinders falling out on the dry shingles, whenever the soot may accidentally take fire.

Weekly discussions.—Farmers will receive much valuable local information by instituting weekly discussions among their neighbors. A moonlight evening may be well spent in this way at a district school-house or town hall, and the agriculture of the district improved, and a neighborly feeling promoted. A part of the time might be well spent by reading short extracts from agricultural papers and discussing their merits.

Work for february.—Continue the labors of the winter, and prepare for the spring and summer's campaign. Draw, cut and spread manure on

grass lands, or pile it up and make compost heaps of it, in such fields as need it. Fill ice houses, prune orchards, cut grafts, and pack them in damp moss or sawdust for spring use, taking care to have them correctly labeled. Lay plans for spring, and for the entire season, so that men may be regularly employed at all times without crowding or confusion; secure good farm laborers—the best are always engaged first, the highest priced are most always the cheapest, by saving constant watching and superintending; a dollar or two more per month will often secure several dollars more in labor, or its equivalent, good management. Open drains or channels in wheat-fields which have become chocked by snow or ice, should be cleared out on the approach of thawing weather. Cattle should be kept off meadows; horses with heaves may be relieved by feeding with wet, cut feed, especially of fine, well-cured corn-stalks.

On stormy days pick over apples in cellars, and such as are beginning to decay, if abundant, may be regularly fed to cattle, horses and swine. Oil harness, make farm gates and ladders, and panels for hurdle fences.

Read carefully the directions for January, which apply equally well at the present season.

Work for march.—Finish the various jobs of winter, and prepare to commence spring labor in earnest. Examine all tools, and put them in good condition. Paint and grease wagons and carts. Examine and replace harrow teeth, if such are needed. Repair hinges of dragging gates, and nail loose boards on fences. Procure and clean grass seed for spring seeding. Examine and obtain a good supply of the best seed of oats, barley, and spring wheat. See that teams are kept in good working order, and if they can be frequently used, half a day at a time, they will become better accustomed to the active labor of spring. Inspect thoroughly all the barns and outbuildings, and see that every part is in good order. Oil harness, and repair it, where necessary, for spring work. This is the month that is found the best to make maple sugar, full directions for which can be found elsewhere.

Sow clover-seed early—it may be most accurately done on a thin snow, rendering the seeds and footsteps visible. Plant early potatoes, for family use, as soon as the ground is thawed; if previously sprouted, in a warm place, an inch or two in length, they will come up sooner. Clean out cellars thoroughly. Give special care to cows and calves. Read carefully the directions for January and February for additional suggestions.

Work for april—Fences.—One of the earliest tasks that can claim the farmer's attention is repairing fences. Systematic managers whose farms are divided by common rail structures, after having determined about

Fig. 31.—Mode of staking rail fences—vertical view.

how long they will continue, say six years, divide their whole farm into six parts, and repair a sixth each year—this keeps all in good order without further trouble, and without having too much to attend to one season, and but little another. Board fences should be annually examined throughout their whole length, and loose boards nailed tight.

New board fences should never be battened on the face or joints over the posts, as the practice tends to cause decay; but in the course of 15 or 20 years, when the ends begin to rot and become loosened, battens will secure and make them strong for several years longer. If farmers are able to replace their old worm fences with post and rail, board or stone fences, they should begin on one side and construct a certain amount each year, keeping a register of the same. Then, in future years, when repairs are needed, they can go through in the same way and in the same number of years.

Fig. 32.—Best mode of staking common rail fences.

In many regions of the country the common crooked rail fence is extensively used, and cannot be immediately replaced by such better forms as board fences, stone walls, or post and rail fence. As commonly constructd, with spreading stakes at each corner, it necessarily occupies a strip of ground nearly a rod wide. Vertical stakes, wired near the top, lessen the difficulty, but are not nearly so strong as when staked according to the made shown in the above figures—seven rails high and two riders besides, makes a very strong fence, about seven feet high.

A good straight fence is sometimes made of split rails, and a common worm fence may be converted into one of this sort. It is composed of six rails for each length, and is about five feet high. It occupies more space than a post or board fence, but much less than a worm fence. The accompanying cut (fig. 33) will show the mode of construction, and represents the place where the two lengths or rails meet. The uprights, which hold the rails to their place are simply two sawed strips of wood, about five inches wide, an inch and a half thick, and five feet long—the length being equal to the height of the fence. They are connected by nailing blocks between them, leaving them about five inches apart. One of these blocks is at the bottom, the other within about a foot of the top. On the latter, the three top rails rest. Three large nails are driven at each place into the blocks. The fence is kept upright by a brace on each side, which also serves as an additional security in holding the uprights together. These braces are five

Fig. 33. Cheap Fence.

feet long about eighteen inches of the lower end entering the earth. Three large nails secure the upper end to the uprights. They may be of sawed stuff, or split like common fence stakes. The lower end of the uprights rests on a flat stone. It will be noticed that no part is subjected to decay, except the braces, the lower end of which enter the ground. These will need occasional renewing, unless of durable wood. All the rest will last as long as the rails, or thirty or forty years. If the nails before using are dipped in hot grease, oil, or gas tar, they will not rust for a long time. The braces should press against the uprights about three feet high.

Where unruly horses prove troublesome, by throwing off the riders of fences, the annoyance may be obviated by boring a small hole through the stake and passing a piece of annealed wire through this hole and around the rider; a day's work will thus secure a long line of fence, and may save many dollars' loss.

The importance of good fences is well understood by those who have observed the difference between crops safe from all intruders, and those occasionally trodden down and ruined; between moving on with the work without interruption, and the frequent annoyance of stopping important operations to run after intruding cattle, colts, pigs, etc.

Meadows.—As soon as these are dry enough to bear feet without injury to the turf, they should be carefully picked of all loose and projecting stones, which might injure a mowing machine, and then well rolled so as to make the surface as smooth and perfect as possible. Stumps should be dug or pulled out, accidental brush or other rubbish removed, and small hillocks leveled down. The farmer who has seen a mowing machine broken, at a cost of five dollars, and a delay of a day, by a stone that might have been removed in five minutes, will appreciate the importance, comfort and economy, of a smooth surface. There is some satisfaction in the reflection that new farm machinery is going to compel the adoption of a smoother and more perfect kind of farming. Much is lost by the imperfect, thin and uneven seeding of meadows. Bare spots and thin grass, amounting as they very often do to one-fourth of the whole surface, would make a total loss of five acres in every twenty acre meadow. Sometimes the loss amounts to much more. The importance of thick and even seeding is not sufficiently appreciated. Thin or bare patches in existing meadows may he covered with grass by running over the meadow with a fine-tooth harrow the first day the surface is dry, then sowing a mixture of clover and timothy, and rolling the seed in. If the meadow has been top-dressed with fine manure in autumn, the harrow will mix it with the surface, and assist the germination of the seed, as well as its subsequent vigorous growth.

Fig. 34—Grass or Meadow unevenly and thinly seeded.

Meadows which were top-dressed with coarse manure in autumn or winter, which was more or less spread in lumps, should be harrowed as early as possible, so as to break those lumps and spread the whole uniformly.

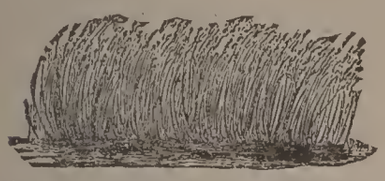


Fig. 35. Grass or Meadow evenly and thickly seeded.

Cattle droppings on meadows or pastures should be finely beaten to pieces and well scattered over the surface as soon as the frost will admit, and before the frost has all disappeared from the soil. It is scarcely necessary to mention that no good farmer ever allows his meadows or pastures to be touched by a hoof early in spring, while the ground is soft.

TEAMS.—Every good manager has already taken care to have his teams in excellent order for the heavy work of spring—but as they have not been much accustomed to hard and steady work, it would be advisable to plow only half a day at a time with them at first, until they become well accustomed to it, using them the other half-day for job work, light teaming, etc. A little care in this respect will often prevent sore shoulders and reduced condition. The harness should be examined frequently, to see that it fits well, and to prevent chafing. It will be observed that when horses are plowing, the traces draw downward, and when attached to a wagon horizontally; the back straps should therefore be lengthened a little when they are removed from the wagon to the plow.

Fig. 36. Cut and Cover Slices.

PLOWING.—Light or gravelly soils, which quickly become dry, may be plowed at almost any time; but rich loams should be taken at precisely the right period. If plowed too early, while yet wet, they may become poached and injured for the season. If left too late, the spring rains may have settled back what the frosts of winter have loosened. Plowing well saves much labor in subsequent tillage. Narrow furrow slices (except with sward) pulverize the soil more perfectly, and leave a beautiful mellow surface. Furrows seven or eight inches deep, and only six inches wide, are easy for the team, and leave the land in very handsome condition.

Fig. 37.—Narrow Furrow Slices.

MANURE.—This may be applied with advantage by putting it on the land in such condition as to be pulverized finely. After spreading, it should always be thoroughly harrowed, and broken and intermixed with the top soil before plowing under. Coarse manure should be used in compost heaps. If very strawy, throw it up into heaps in the yard for remaining during the summer; if less strawy, draw it out to the fields where it is to be applied, and make compost heaps by thin alternate layers of turf or loam and manure.

CARROTS.—Failure often results with this crop by being planted too late—the seeds miss, the sun burns the heads. Get them in as early as possible, or as soon as the ground can be made thoroughly mellow. It does not pay to plant carrots on foul or weedy ground. The labor of hoeing will be too great, but if the ground is clean, rich and mellow, carrots may be made eminently profitable. Farmers often think it necessary to turn their animals on early grass, thus injuring the turf; but a supply of carrots in spring would give them all the advantages of green food, and none of its drawbacks.

BARLEY AND OATS.—Sow these as early as the seed can be put in prepared land—we have known a delay of two weeks to lessen the crop equal to its entire net profit.

POTATOES should also be planted early, for the great mass of experience is in favor of early planting to prevent rot.

CALVES.—The great secret of success in raising calves, after keeping them clean and comfortable, is very regular and uniform feeding, combined with nutritious food, and avoiding all sudden changes in their food. On the whole, it is best to wean them very early, as they will then never suck the cow again or themselves. Their food may at first be new milk, then warm skimmed milk, then skimmed milk with meal intermixed, thus passing from new milk to common food, with meal, and being especially careful that all these changes should be very gradual, and almost imperceptible.

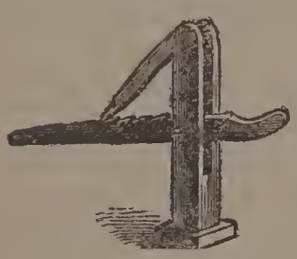


Fig. 38.—Wagon Jack.

WHEAT CROPS.—Red root and cockle should be pulled early, and not a vestige of either left.

RAINY DAYS.—Clear out all rubbish from cellars, and keep them clean and well purified. Grease wagons, oil harness, brush up stables, examine and repair tools, and have them all in perfect order for the busy season now about to commence. Prepare account books, and keep an accurate account with every field. You can more easily spare a whole day now in preparing matters than you can in busy season afford to give an hour. So don't postpone.

ORCHARDS AND SHADE TREES.—The enterprising farmer should not overlook these. The time for planting may vary considerably with circumstances; if they have been dug up early, before the buds have swollen, and have been well heeled in, they may be set out safely, even after the leaves on standing trees have begun to appear. The great point is to take up the roots with them; they are in many cases nearly all left behind; stems and tops are of not much value without roots. If, in removing trees, this point is carefully attended to, and the roots are well spread out in every direction

when set, they cannot fail to grow, and one in a thousand will not be lost. After that the great matter is to keep the surface mellow and well cultivated.

WORK FOR MAY.—The prominent and important labors of this month are the completion of seeding spring crops, where this has not already been done, and planting hoed crops.

CORN.—The amount of this crop raised is more controlled by good and bad management than almost any other. Farmers have different ideas about the quantity that should be raised to an acre, some being satisfied with thirty bushels, they should average at least eighty bushels—over one hundred may be reached. The materials for success are a well prepared, rich soil, and constant and clean cultivation. The former claims especial attention at present. A sward inverted to a moderate depth is a favorite mode of planting; it succeeds admirably if it has been well manured on the surface the previous autumn, the rains carrying the enriching portions into the soil. On good ground this will often make a difference of twenty to twenty-five bushels per acre. Inverting the whole sod perfectly will save much hand hoeing. Rolling and then harrowing lengthwise with the sod is the common mode; but Share's harrow (if made of steel teeth,) accomplishes both these operations in one, and mellows the soil twice as deep as common harrowing. Mark the rows perfectly straight and even, this will allow the horse cultivator to run close to the rows. In strong or heavy soils never plant over an inch deep—in light soils not over an inch and a half. Experiments have shown that beyond these depths the corn is smaller and longer in coming up. When manure is applied in spring, it should be fine, and thoroughly intermixed by harrowing. In lumps it will be of little use. The old-fashioned way of frightening crows and blackbirds was the creation of effigies known as scare-crows (fig. 39) stretched across the field, if sufficiently numerous, will repel crows; but the best way is to tar the seed. To do this right, dash hot water on a half bushel of corn, which by draining off quickly will heat the surface of the grain without killing the germ. Then pour on a pint of hot tar—every grain will become thinly coated, then dust with air-slacked lime, which is best, or with plaster. No bird will touch the seed when planted. Gas tar cannot safely be substituted, as it often kills the germ, or coats it so that water cannot enter. Plant all missing hills with the earliest sorts, that all may ripen together.

Fig. 39. Old-fashioned scare-crow.

Dropping concentrated manure into the hills gives the plants an early start, and increases the amount of the crop. As old corn is better than new for fall feeding, a substitute may be obtained by planting an early

crop of the Early Canada, which will be hard and dry, while common corn is yet soft.

Potatoes.—To raise potatoes to a profit, it is important to avoid much hand hoeing. Let the ground be therefore perfectly clean. If mellow and smooth, it may be managed as follows: Plow furrows three feet apart, and drop the pieces a foot and a half in the row, then with a one-horse plow, or what is better, with a large-toothed one-horse cultivator, the central tooth being removed, cover the row, leaving a ridge over it. Let it remain about two weeks, or just before the potatoes come up, then harrow the whole surface lengthwise. This will be as good as one thorough hoeing by hand. Potatoes planted eighteen inches asunder in the row will give nearly double the amount obtained from hills three feet apart. No farmer should be satisfied with less than 300 bushels per acre of potatoes.

Roots.—Plant a good supply of field beets, carrots, rutabagas and parsnips. A daily supply of these in winter, mixed with dry food, will contribute largely to the health and thrift of domestic animals. Many farmers fail in raising these crops by not attending to the three essential requisites, viz: a rich soil, clear from weeds, and keeping the whole so well cultivated that weeds cannot start. All novices in raising rutabagas allow four times too many roots to grow. They should be thinned about a foot and a half apart, if the soil is as rich as it should be. Planting any of these crops on any other than a well enriched or manured soil, is a waste of land and labor.

Fig. 40. Fig. 41. Fig. 42.

Corn for fodder may be sown at the close of the month, for early cutting, or for soiling—for either purpose, it should not all ripen at the same time.

Fig. 40—Light crop, sowed thin, in drills. Fig. 41—Heavy crop, sowed thick, in drills. Fig. 42—Light crop, effect of broadcast sowing.

The best way is to sow in furrows or drills, by plowing, harrowing and marking out the furrows three feet apart, then strew the grain from the basket into the furrows by hand, at the rate of three bushels per acre, and cover with a harrow, nothing further will be needed, but to pass the one-horse cultivator after the plants are up. It is often sown too thin, making tall but coarse stalks, as fig. 40; when sown broadcast it is apt to be weedy, as in fig. 41; but sown in thick drills, about three bushels per acre, as in fig. 42, is best.

Buckwheat.—Although this crop is not sown for some weeks yet to come, the ground should be well prepared or mellowed for some time beforehand. Don't postpone this preparation till the last moment.

Calves.—To raise good calves they should be fed the whole season, and

one great secret of good management is to avoid any sudden changes in their food.

SORGHUM.—This should be sown as early as the corn crop. Many cover the seed too deep. They are smaller than corn, and should under no circumstances be buried more than an inch.

There are several operations of smaller importance which should not be overlooked during this month. Particular attention should be given to fences around pastures, and they should be made strong and secure. Buildings and fences may now be whitewashed to advantage. The work should be done on a dry day—when the whitewash will enter the pores of the wood. Painting, on the other hand, should be deferred till autumn, when the coat will harden better, and it will become more durable. Orchards, which were transplanted in autumn, should have the crusted soil about the young trees broken and made mellow—it is leaving this hard crust untouched that has induced many to think that autumn planting for hardy trees is not so good as in spring. Coarse manure may be made into compost heaps for fall use. Mullens and thistles should be dug up in pastures, and all early starting weeds should be destroyed.

WORK FOR JUNE—CORN FODDER.—Continue or finish the seeding of corn fodder, as described in work for May. It is a great advantage to have a succession for soiling, in the dry part of autumn. By sowing large kinds early, and small or early varieties late, a long succession may be obtained. Any vacant ground may be well filled up with this crop, and if sown in furrows, as already described, and cultivated twice, it will leave the ground, when harvested, clean and in fine condition, and the roots remaining will enrich the land. Hence the corn fodder crop may be regarded as one of the best for improving the soil.

CULTIVATING AND HOEING CORN.—Every farmer should endeavor to accomplish as much as possible by horse labor, and save hard hoeing. To this end the soil should previously be in as clean condition as practicable, and perfectly straight and even rows will allow the cultivator to pass close to them. More corn will grow on an acre if planted in drills, or in thick rows of hills, in one direction; but when labor is scarce, it may be more economical on the whole to plant in hills both ways, unless the land should be unusually clean; the nearer the rows or hills can be to each other—that is, the more evenly distributed the corn is over the ground, the greater will be the crop, other things being equal. One of the best farmers we know plants his corn three feet each way. His average is eighty bushels per acre; he has obtained 130, with high manuring and best management.

While it is desirable to employ enough hand labor to keep down every weed, the main reliance should be on horse culture—one horse accomplish-

ing as much as the men. An excellent practice, which has proved very successful, especially in strong soils liable to become crusted, is to pass the cultivator once a week regularly, from the time it is up until too large to admit a horse between the rows.

Where there are missing hills in a cornfield, replant with an earlier sort, or plant three hills of bush beans to each hill of corn.

RUTA BAGAS.—These succeed well on all rich and rather light soils. Unless the soil be well enriched, it will be seed wasted and labor lost. They cannot be sown profitably without a good drill, which will plant several acres per day. In small experiments the seed may be dropped by nailing a tin cup to the lower end of a cane or stick, perforating the botton with a small hole, a trifle larger than a seed, and shaking this with the seed along the drill, and covering by raking. This does well for garden crops. Never allow the weeds to become more than an inch high, and thin out the plants to at least one foot apart in the drill, or a foot and a half in very rich land. All novices in raising this crop may be quickly known by leaving too many plants, which crowd and diminish each other in size.

Fig. 43.—Well Cultivated Root Crops.

WEEDS.—Prompt and energetic destruction of weeds constitutes a prominent portion of the labors of this month. The great point is to take them early, when they are small and feeble. A weed in growing from an inch to a foot in height, increases as the cube, or a thousand fold in weight or bulk, and exhausts the soil correspondingly. Single weeds often produce 500 to 1,000 seed—sometimes several thousand. Scattering these over the soil occasions necessarily a great increase of labor another year.

Fig. 44.—Root Crops grown among weeds.

HOES.—Procure the very best that can be had in the market. The difference in price between a cheap and a good tool may be earned by the latter in a single day. Keeping hoes ground sharp will enable the laborers who use them to perform more and better work.

CLOVER SEED.—The first crop should be cut before the end of this month, or if pastured down, the animals should be removed at the same time.

SHEEP WASHING should be performed as early as the weather will safely admit—and after shearing, special care should be taken to shelter the sheep during cold storms.

ANIMALS BLOATED.—If animals become bloated from eating fresh clover, the best remedy is a dose of pulverized charcoal, say a teaspoonful to a full grown cow, and a dose of corresponding size for other animals, according

to their weight. The charcoal is best if fresh, or if kept corked air-tight in bottles. It should be mixed well with water, and may be poured down the throat from a junk bottle. Fresh burning coals from any wood fire, pulverized at once in a mortar, will make a good material, but the article usually sold and made in coal pits, is too hard, and generally too old to be good.

ORCHARDS.—Newly set orchards should have the soil well cultivated or mellowed about the trees, and kept perfectly free from the grass and weeds. On the approach of hot and dry weather, a wide and deep mulching of old straw or other litter will be useful. All orchards should be carefully examined for the borer, which if taken in time may be easily killed before it has gone far into the wood; even afterwards, by clearing away the powdered wood, the insect may be followed and destroyed in his hole, by a wire or flexible twig. Scraping away the earth from the foot of the trunk, and applying soft soap, will serve to repel these insects from depositing their eggs, but is not always infallible.

There are a few other operations that should not be forgotten in time. Destroy catterpillars in orchards; white-wash fences and buildings; on rainy days get harvest tools all ready; provide hives for swarming bees.

WORK FOR JULY.—Continue to cultivate well till arrested by the labors of haying and harvesting. Continue the war against weeds, and before they go to seed cast them out of your land. See work for June.

HAYING.—The best time to cut hay is at the transition from flower to seed. The precise point, of course, cannot generally be attained in ordinary practice, where many days are required for securing a crop, but the nearer we come to it the better. The expedition accomplished by means of mowing machines, horse-rakes and horse-forks, has, however, greatly facilitated this object. Cutting grass early produces more readily a good after growth, if done too soon, it will lack substance; if too late, it will be hard and woody. Celerity of operations depends much on good management, and having everything in readiness. The omission of some requisite will delay the whole, and a day's delay, by throwing the mass of the work into a rain storm, may result in heavy loss.

Stacking in the open field cannot be recommended. Ample barns should always be provided. Yet temporary necessity may often require stacking. When resorted to, it should be done well; the stacks built even and with symmetrical form; the hay should be pitched on from different sides to preserve upright and even settling; for when a stack settles to one side, it necessarily exposes the upper side to rain, and often to the loss of a large portion of the stack.

Fig. 45. Evenly Built Stack.

Fig. 46. Unevenly Built Stack.

Good stackers repeatedly and regulary pass around the structure, and place the hay in uniform forkfuls in regular and circular layers. The centre is always rounded the highest. In a well built stack the fibers at the outside falling downwards prevent any rain from passing in but a few inches; one laid up badly may allow the water to enter a foot or more. The sprinkling of a peck to half a bushel of salt through each ton of hay assists in preserving it, and renders it more palatable.

HAY CAPS.—In regions of the country liable to sudden storms, and in proximity to cities when hay commands a high price, hay caps (fig. 47) are important and valuable, frequently saving much labor, and preserving the quality of the hay. After a little practice in use they may be applied in less time than is commonly required for trimming the cocks. The following directions for making them are given:—"Take four yards of yard-wide cotton sheeting; sew it together so as to make two yards square; hem the rough edges; turn up each corner two or three inches, and sew it strongly; tie in a short strong twine to form a loop, and you have a hay cap ready for use. Four sharp wooden pins, of hard wood, half an inch in diameter, 18 inches long, to be thrust upwards through the loops into the hay at the bottom of the cock, completes the preparation.

Fig. 47.—Hay Cap.

WHEAT.—Cut this as nearly as practicable about one week before it is usually dead ripe. Careful experiments show that the grain is heaviest and makes the best flour, while a portion, say about one-third, of the chaff is yet green, or with green streaks running through it, and the straw is brighter and richer. The same crop will of course vary some, and the time cannot always be controlled to a day, but the above rule should be aimed at. It is always worth paying something for insurance, and the extra labor required for putting up good, well capped shocks, in which the grain may stand until thoroughly dry, is a very profitable premium to pay. Seven sheaves form a good size—the caps should be bound very tightly near the buts, and the straw broken down all around before placing it. Practice will enable a hand to shock very rapidly. Hay caps, made of cotton, form an excellent covering for wheat, when they can be had.

Fig. 48.—Mode of making Wheat Shocks.

Fig. 49.—Flanders Grain Cradle.

It is necessary, in every grain field, to cut certain portions by hand; for this purpose one of the best implements is a Grain Cradle (fig. 49), which is easily adjusted by screws and wires.

TIMOTHY SEED.—Select the best portions of timothy meadows for seed, pulling out any weeds or foul stuff which may be found in it.

Sow buckwheat during the present month. The ground should have been previously well prepared for it, and rendered clean and mellow. The failure of this crop is often owing to the imperfect manner in which it is put in.

CUTTING TIMBER.—The best season for cutting timber has caused much discussion; but full experiments have shown that it always lasts longest when most rapidly seasoned; this is more especially the case with all the soft and less durable kinds of timber. Basswood rails cut and split at midsummer, with the bark immediately peeled from the wood, will dry rapidly, and become durable and hard, like horn; cut in winter or spring, it dries slowly, generally becomes sap-rotten, and is of little value.

ORCHARDS.—These, if young, should be kept well cultivated throughout summer, either in low, hoed crops, or if in mellow soil, without crops. This treatment is most important for peach trees, which will grow at least ten times as fast as when their cultivation is neglected; apples three or four times as fast. Newly set cherry trees often die during the heat of midsummer, which is easily prevented by a wide and thick mulching placed around them. Watering young trees, at this time, usually does more harm than good, by merely crusting the surface without moistening the roots, and at best affording but an irregular and temporary supply. If the surface of the soil is kept mellow it will preserve moisture enough in the earth, and the rapid growth of the tree will render water unnecessary. The black-knot, which so often disfigures and destroys plum trees, may be kept off by watching and constantly cutting it away on its first appearance.

WEEDS.—The busy labors of July are apt to cause a neglect of weeds; and farmers who have kept their hoed crops clean until now, frequently neglect them, and they become foul. One thing that is false economy, is to permit this, for it would certainly pay to engage a little more labor in destroying these weeds so that they may not seed the whole land for another year.

WORK FOR AUGUST—HARVESTING.—In the far North, where this work is not yet completed, the reader is referred to the directions for July. Oats, however, in many places yet remain to be cut. This should be done while the straw is yet slightly green—the straw will be more valuable, and the grain not shell out as when fully ripe. The gleanings of all grain fields may be secured with a horse rake.

STUBBLE GROUND.—To destroy the seeds of weeds, harrow all stubble ground as soon as the harvest has been secured, or pigs have eaten the gleanings—the first rain will then cause all seeds to germinate, and the next plowing will turn under the green crop as manure.

HARVEST TOOLS.—These are often neglected, and suffered to remain weeks

exposed to the weather, to their serious injury, by the rusting of metal and the decay of wood. Let them all be carefully housed, after having been thoroughly cleaned, and the bright metal parts rubbed slightly with lard-oil or melted grafting wax.

SEED WHEAT.—In order to keep up the highest quality or to improve the seed of wheat, select the very best portions of the field, and exclude the seeds of every weed, and especially of that notorious intruder, "chess;" many careful farmers by continued attention for years, have succeeded in entirely eradicating chess from their farms. To improve the quality of seed wheat, the largest and finest heads may be selected by hand; the process repeated year after year will give very encouraging results, a half day spent in thus selecting the best heads will furnish a considerable amount, and all weeds may thus be kept out. The best winnowing machines may also be used for this purpose, separating the largest, best and earliest ripening grain from the rest.

WEEDS.—This is the season of the year when many weeds ripen and scatter their seeds. A day's work now properly applied, may therefore save a half dozen days' labor another season. Clear all the weeds out of corn and potato fields, root crops and gardens. Briers cut during this month will be severely checked in growth, and sometimes destroyed. Plow in deeply the ox-eye daisy; dig up all scattered plants which appear before winter, and follow next year with a hoed crop.

DRAINING.—On lands which were too wet to underdrain last spring, the work may now be done to advantage. Muck swamps, which may be reclaimed and brought into cultivation, or which may afford muck for compost heaps, should now be thoroughly underdrained. The muck for manure should be thrown out and formed into large, well shaped heaps, and they will become dry in the course of a few months. To prevent rains from soaking these heaps, they may be neatly covered with boards or thatch, or if even made with a smooth sloping top, beaten hard with a spade, much of the rain will be thrown off from the surface. The disappointment which many meet with in the use of muck with manure, is owing to the amount of water which it already contains, preventing the absorption of the liquid parts of the manure. Wet muck is usually about nine-tenths water; and if rendered perfectly dry, will therefore absorb about nine times its own weight of liquid manure: hence the importance of using it in yards or manure heaps as dry as possible.

MANURING WHEAT.—In most of our best wheat regions, unless the soil is already quite rich, the most effective use of manure is as a top-dressing after the land is plowed. It has often increased the crop eight or ten bushels per acre, and sometimes given a good yield of the Mediterranean vari-

ety where the winter has nearly destroyed undressed fields. The manure for this purpose should be fine or well rotted and well broken by harrowing. To prevent the manure wagons from hardening the plowed soil, it is a good way to plow and then dress a strip on the further side of the field, and then repeat the process on successive strips till the whole is completed. If the soil is very dry, bring the moist portions up by deep plowing, and drill in immediately.

STACKS AND STRAW.—Every farmer, where practicable, should provide barn room for all his hay and straw; but where stacks become necessary, much may be done for securing their contents in good condition by retopping them. A load of straw neatly placed upon the top of a large haystack, and neatly raked downwards, or what is better, a thatched top, would be of great benefit.

Farmers who have ample barn room, with their grain safe from rats, and who are not compelled to hurry it early into market, will do best to leave their threshing until winter. A small machine, driven by a two-horse endless chain power, will enable them to go through the work at that time with little or no additional help for attendance. The straw being fresh will be preferred by animals; where, however, threshing is done now, care should be taken to secure straw in good stacks, protected from the weather. Good, well preserved straw will assist much in wintering animals, and if fed in connection with a small portion of grain or meal, may bring them through in good condition, more cheaply than if fed on hay alone. The daily use of a portion of straw as litter will help toward the manufacture of a large amount of manure. The straw should therefore be placed where it is easily accessible at all times. The stacks or ricks should therefore be as carefully built as stacks for hay.

FATTENING ANIMALS.—Feeding these should be commenced early in the season—the same amount of food will go much further now than in cold weather; late summer apples may be fed to swine. Select and purchase all needed stock.

MEADOWS.—These should be now cleaned of all bushes, rocks, stones and other rubbish, which may interfere with the mowing machine another season.

FENCES AND STONE WALLS.—Farmers who have loose stones, or quarries, may be furnished with the best of all barriers in the shape of good stone walls. A few weeks spent each year will after a time furnish the farm. The great leading requisite, to prevent the frost from ultimately throwing them over, is to set them in trenches. These trenches should be as wide as the bottom of the wall, and deep enough to be below frost—say from a foot to eighteen inches these trenches may be filled with such small stones

as cannot be used in the wall; large ones will not answer. The trenches should never become filled with water. Walls built upon the surface of the ground, no matter how well built and how perfect the blocks may be, will soon become distorted by heaving, and be ultimately overthrown by frost. Where the stone are not good for building, the wall may be bound together by strong cross-ties of durable wood, placed about half way up, or at two or three different distances up—cut the right length with a saw, and split thin, and two or three inches wide. In such cases, or where stone is not abundant, half-wall may be built, capped with two rails, supported by stakes.

SOWING TIMOTHY SEED.—The great point is to have good, clean crops. The best portion of the meadow should be selected, and all foul weeds previously cleaned by hand. It is usually cut too late, or when the seed shells. The best time is when most of the heads have become brown. It is unimportant how it is cut, provided it is taken in before the seed wastes, and is not allowed to heat or mold. It may be cradled at some height, the rest being afterwards cut with a mowing machine, or it may be cut with a hand-scythe—narrow swathes and a little practice enabling the workman to throw the heads all one way. It will usually be dry enough to bind in a day or two.

WORK FOR SEPTEMBER—SOWING WHEAT.—The preparation of ground for wheat is an important labor for this month. The ground should be made mellow, that the moisture may be preserved, and the seed vegetate freely. It should be clear from weeds and their seed, that the crop may not be choked, the product rendered foul or impure, nor the subsequent grass crop diminished in value. Experience only will teach the farmer the proper degree of fertility—there are very few farms, however, where the addition of fine manure will not be advantageous. An excellent mode of managing it is the top-dressing given in the directions for work for August. This top-dressing also assists the germination of grass seed, thus affording the advantages of thick seeding, and insuring a vigorous growth of the plants. Timothy seed sown with the wheat, or, immediately after, usually produces too strong a growth, and lessens the wheat crop, as well as interferes with the harvesting; it is best, therefore, to sow it about a fortnight afterwards, and the clover as early as possible the following spring. This top dressing also protects the surface of heavy soils, and lessens the tendency to freeze out. Sowing wheat early produces stronger plants and a better crop, but does not cause earlier ripening of the grain. The drill seeding, if properly performed, gives the best crops, often from 3 to 5 bushels more per acre—but much drill seeding is improperly performed, the seeds being deposited too deep—an inch and a half on heavy soils, and two inches in light ones, are better than any greater depth; if the soil is moist enough, a less depth is better. Any farmer may satisfy himself on

this point, and gain valuable practical information, by a few measured experiments. Some who have set their drills much too deep, have had lighter crops than with ordinary broadcast sowing, and have hastily denounced all machines of the kind. Seed wheat that is infected with smut may be purified by washing in brine and then sprinkling and stirring in powdered slaked lime.

Seed corn.—Improved varieties always tend to run backwards; the farmer should therefore constantly select the best ears for seed; this should be a regular yearly business, and if faithfully carried out, will give an increase of several bushels per acre, in the long run.

Swine.—The falling apples in orchards may now be fed to swine, and in connection with richer and drier food, will cause them to fatten rapidly. Winter apple trees are often allowed to over-bear, and the removal of a portion of the crop, for feeding these animals, will improve the remainder. No tree should ever bear heavy enough to need propping. The yards and apartments in which swine are kept, should be scrupulously clean, and rendered comfortable by dry litter. Experiments have shown that they fatten faster under these circumstances. Great pains should be taken to feed them with clock-work regularity, and not to give so much at a time that some will be left, and a distaste for food produced; neither should they ever be allowed to squeal off their flesh by waiting impatiently.

Butter.—This is usually the best month for the manufacture of butter; the great leading requisites for success in which are, first, the most important, good, sweet, rich, abundant pasture; secondly, good cows; thirdly, perfect cleanliness in the dairy house, in all the vessels used in it, and in the air which surrounds it; fourthly, general and skillful management throughout. Under the latter head may be mentioned shallow pans or shallow milk in the pans, proper temperature of the cream, and working out all the buttermilk. See the full directions elsewhere.

Top-dressing meadows.—The best mode of manuring meadows is thoroughly enriching the soil by manure applied to the crops which precede laying down. But scarcely inferior, and perhaps equal to this treatment, on clayey soils, is autumn top-dressing. The manure for this purpose should be broken fine, and very evenly spread. Harrowing, some weeks after the application of the manure, will often be useful where the grass is short. The manure, thus applied, causes a strong autumn growth, enriches the surface soil by the washing in of the autumn rains, and both the manure and the increase of grass protect the roots during winter, and give an early growth in the spring.

General hints.—There are a large number of farm operations which should not be forgotten during the present month. The erection of suita-

ble buildings for sheltering domestic animals the coming winter, is a very important one; drain bogs when dry enough; clean meadows of all scattered stones and rubbish; see that root crops are kept clear of weeds; examine and repair all fences; soil and feed cows if the pastures are short; grub up bushes and briers; cut up straggling thistles in pastures; pull up scattered mulleins by roadsides; harvest buckwheat as soon as it ripens; clean and ventilate cellars on rainy days. Attend agricultural exhibitions and acquire all the new valuable hints which such opportunities afford.

Cutting up corn.—Much labor is saved, by taking no unnecessary steps; this is the reason that some men accomplish more than others with equal exertion. The remark applies particularly to cutting up corn—where a regular system will save many steps. If the corn is of large variety, or in large hills, twenty-five hills will make one shock, (fig. 50) and the inexperienced workman may take three hills at a time, each successive three being designated by figures in the accompanying cut, the dotted lines connecting the three smaller varieties of corn, in smaller hills, will enable the expert laborer to take six hills at a time, and to form a large shock of forty-nine hills (fig. 51); commencing at *a*, he takes the first three as a beginning; next at *b*, he takes six; at *c*, the next six, and so on, the dotted lines showing his footsteps. A larger armful may be taken by placing the arm above and before the hill, instead of behind it.

Fig. 50. Mode of Cutting Corn by hand 25 hills tc each Shock.

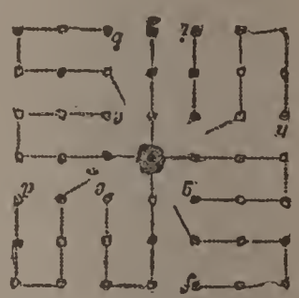


Fig. 51. Mode of Cutting up Corn, forming a Shock of 49 hills.

The common mode in cutting is to place the shock around a central uncut hill, which occasions some inconvenience in husking, to obviate which the corn horse is used. It consists of a pole about twelve feet in length, and nearly as large as a common wagon tongue. One mode of constructing it (shown in fi5. 52) is by placing the legs at the end of the pole, the other end resting on the ground. Two or three feet back of the legs a horizontal hole is bored, admitting loosely a rod four or five feet long. The corn when cut is placed in the four corners made by the rod and pole, and when the shock is finished, the rod is pulled out and the pole drawn backward.

Fig. 52. Corn Horse used in constructing shocks.

Stone walls.—At the present season, between harvesting and the securing of autumn crops, it is an excellent time to draw stone, and construct stone walls or fences. The durability of a wall depends greatly on the manner in which it is built. The best mode should therefore be well under

stood. The most important of all requisites is to build the wall in a trench, dug to a depth corresponding to the depth to which the soil freezes. This trench should be compactly filled with small rounded stone, broken stone, or with coarse clean gravel, according to circumstances, or supplies at hand. If the soil is compact, this trench should have a drainage, or outlet. On these small stones the wall is erected. It often happens that an under drain three feet deep, filled to the surface with small stone, may serve as a good foundation for the wall; but unless the soil is tenacious, and especially if inclining to the nature of quicksand, it will be liable to work into the ditch at the sides and toward the top, unless well shielded with a lining of flat stones or of gravel. A wall with such a base as this will remain unmoved by frost for ages; while one placed merely on the surface will rise and fall at every freezing and thawing, the stones will become gradually displaced, and before many years will totter and fall.

The best stones are such as are flat or in square blocks. But a substantial wall may be made of round or cobble stones, if they are solidly laid, and cross-ties of wood are employed. The lower series of these ties should be near the bottom or about a foot higher, the second, two thirds of the way to the top, or if the stones are nearly round, three or four may be placed at different heights. They are all sawed of distinct lengths for this purpose, and should be split, so as to be about half an inch thick, and two or three inches wide. If made of durable wood they will last an age, as they are less exposed than fence rails, being covered by the stone, and nearly always dry.

Fig. 53.—Cross Section of Well Built Wall.

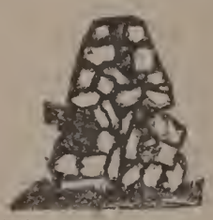


Fig. 54.—Cross Section of Badly Built Wall.

BREAKING JOINTS.—This is of great importance in laying up the wall. If well attended to, makes it inconceivably stronger. The accompanying figures (55 and 56) clearly explain themselves, and show the difference between breaking thejoints and the improper forming of vertical seams, presenting many chances for the wall to fall apart.

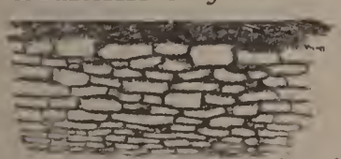


Fig. 55.—Side view of wall well laid, or with joints broken.

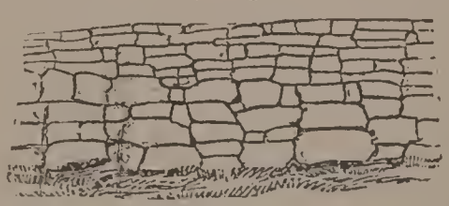


Fig. 56.—Side view of wall badly laid, or with joints not broken.

After the wall is built, the earth should be raised in a moderate slope, about half a foot against the sides, to throw off water, and as an additional protection to the foundation against frost.

Sometimes posts are set in the walls for receiving these two top rails; they present a neater appearance, but are apt to crowd the stones apart,

and throw the wall down. A good stone wall is the most perfect of all farm fences, and well-built of large block stones will last for ages.

Where stone are good and abundant, the wall may be built four and a half feet high, which will serve as a complete fence. In other cases, a half-wall will be found more convenient, being built two and a half to three feet high, and finished by first laying a rail on the top, then crossing stakes, and finally a rider. [Fig. 57.—End view of half-wall, on trench. Fig. 58.—End view of wall with wooden cross-ties.]

Fig. 58.

Fig. 57.

WORK FOR OCTOBER—Harvesting buckwheat.—Some judgment is needed in selecting the best time, as the grain ripens successively. When cut, which should be while the dew is on, to prevent shelling, it should be placed immediately in stacks, where it will cure better than to lie in the swath, and not be in danger of becoming soiled. The stacks should be rather large, so as to stand well. A small band should be placed around the top. Thus secured, the straw dries safely and readily.

Husking corn.—All the different husking machines have so far amounted to nothing, for the reason that nearly as much time is required to break the unhusked corn from the stalk as to break it out of the husks. Farmers must therefore for the present depend on hand husking. Some huskers will work three times as fast as others, chiefly by having everything close at hand. While an awkward laborer is picking up a stalk, pulling off the husk and ear, and then turning around to lay the stalk in a pile, a skillful workman will have husked half a dozen ears.

Winter apples.—These should be all carefully hand-picked to prevent bruising. Light ladders should be provided, and great caution be exercised not to bruise any portion of the tree. Baskets, provided with hooks for hanging on the limbs, is a common and good way, but a better and more expeditious one is to take a common, clean grain bag, and place a stick, sharpened at each end, about twelve inches long, so as to prop the mouth open, leaving a triangular opening for the reception of apples as fast as picked with both hands. Tie the upper and lower corners together by placing a pebble in the lower corner, so as to form a sort of button, and then tying the bag strings closely above it. The bag is then slung over the shoulder, as shown in fig. 59. A piece of stiff leather buttoned on the shoulder serves to protect it from the weight of the bag. Portions of the tree which cannot be reached with an ordinary lad-

Fig. 59.

Fig. 60.

der, may be gathered by the standing ladder, (fig. 60.) Fruit on the ends of long and tall branches may be gathered by means of the fruit picker, shown in the annexed figure, (61.) It consists of a piece of stiff wire about two feet long, bent into the form shown at *a;* the two ends are then thrust through gimlet holes in the end of a pole; a small bag, large enough to hold half a dozen apples, is then sewed to the wire. This completes the instrument. The narrow part of the wire assists in removing the stem from the branch. A picker of this kind is especially valuable in gathering any high priced fruit, such as pears, which would otherwise be bruised and spoiled. As some fruit, such as autumn varieties, must necessarily fall, the ground of orchards, or beneath trees, should always be kept smooth, and as free from stones as possible.

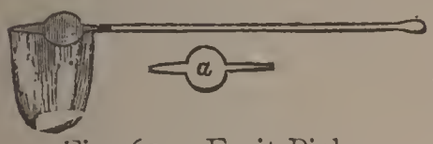


Fig. 61.—Fruit Picker.

VINEGAR may be made from cider by adding two quarts of molasses to each barrel of cider, and exposing it to the warm sunshine and air.

NEW CORN may be prepared for early grinding by suspending it in a coarse bag near the ceiling of any warm room where a fire is kept.

PLANTING NEW ORCHARDS.—The ground should be well prepared beforehand for new orchards, whether the trees are set out in autumn or spring. Unless the soil is already quite rich enough, its fertility should he increased by manure previously applied, or to previous crops; or it may be enriched after the trees are set out, by autumn top dressing for working under in spring. The soil should also be drained and subsoiled, or deeply plowed.

STUBBLE GROUND.—All stubble ground should be well harrowed to start the weeds, which may be turned under the present autumn or next spring.

PAINTING BUILDINGS.—This is the best season of the year for out-door painting, when the sun will not dry the paint powder, but it will form a hard, durable coat.

FATTENING ANIMALS.—The feeding of all domestic animals for fattening should be carefully and regularly continued during the present month. Regularity as to time is of great importance—the animal's appetite is an accurate chronometer, and unusual delay is certain to result in a waste of flesh. It is important to attend to all their comforts—a great secret of success with skillful managers. Especially avoid waste, dirt and surfeit. Some of the best farmers are very careful to commence foddering cattle early, or as soon as frost affects the grass—that being regarded as the most critical period in the year, and when cattle fall away most readily, or contract fatal diseases.

WORK FOR NOVEMBER.—During this month autumn work must be closed up, and preparations made for winter.

ROOTS.—Ruta bagas and other root crops should be harvested early in the month, or one freezing night may destroy them. A special provision

should be made for the preservation of ruta bagas in masses to prevent their heating and spoiling. If buried out of doors they should be in a long pile, with frequent ventilating wisps of straw at the top; if stored in cellars they should be placed on a wooden grate or rack, so that the air may frequently pass under and up through them. All roots, whether turnips, beets or carrots, should be packed away clean and dry.

ANIMALS.—Keep all fattening animals comfortable, dry and warm. Feed them regularly, frequently, and in moderate quantities. Do not try to economize by giving them foul or musty food. Provide places where they can obtain pure water at pleasure, throughout the winter. Do not depend on pasture, especially after the frost has dried it, but give fodder with a small, regular supply of meal. Many cattle are injured and badly fitted for winter by compelling them to live on pasture alone late in autumn. When pumpkins are abundant, pains should be taken to keep them well and to prevent their freezing. When frozen hard like stone, or after they have thawed and become rotten, they are poor food. They may be placed in large heaps in a sheltered place—will give cattle a fair start into winter.

GRAIN FIELDS.—Where wheat-fields have not been top-dressed with manure, as mentioned in the directions for September, a thin dressing of fine manure can be still supplied. It will serve to protect against winter-killing, and make a fine rich surface for the clover seed in spring. Provide surface drains wherever they will be needed, and shovel out the loose earth, that the water may run freely.

MANURE.—All the manure which can be found on the premises, or scraped up in the yard, should be spread before winter. Applied to grass lands, whether for pastures, meadows, or for turning under to be planted with corn, it will be worth twice as much as to be applied next spring. In some cases an increase of twenty-five bushels of corn per acre has resulted from thus manuring the soil in autumn, over a spring application.

FALL PLOWING.—It will greatly assist the labors of next spring, in planting and sowing early, to do as much plowing late in autumn as practicable. In order that there may be a free drainage, the furrows should run directly up and down hill, by the shortest slope; if plowed across, the furrows will become filled, and the land soaked with water. It may be well to shovel the loose earth out of the dead furrows for the same purpose. If the ground is wet or undrained, plow narrow lands. This treatment will enable the farmer to work his land early in the spring.

SHELTER AND STABLES.—Prepare stables and sheds for winter, securing loose boards, making all necessary repairs, clearing away rubbish, and rendering the whole clean and comfortable.

GENERAL HINTS.—Save cornstalks from rain—for every farmer knows

well the difference between fine, green, fresh fodder, and that which is wet, mouldy, and half rotten. Finish under-draining. Keep cellars clean and neat. Shelter all tools, and apply a thin coating of lard and resin to such parts as might become rusted. Draw leaves from the woods for littering stables and converting to manure—nothing is better than dry leaves for bedding animals on imperfect floors, as they entirely exclude the cold currents which would pass through straw.

Fig. 62. Mode of banking up trees to protect from mice.

ORCHARDS.—Transplant hardy trees—in windy places stake them against the wind. Where danger is feared from mice, all damage may be avoided by a small mound of compact earth a foot high, around each tree, beaten smooth with the spade (fig 62). A mouse will never ascend a smooth bank of bare earth under snow; and, if trees are heeled in for winter, they may be secured from mice by observing the same precaution. It often happens that trees may be procured best in autumn, where they are to be brought long distances, or where it is desirable to make the best selection from nurseries. In such cases it is often more convenient to set them out the following spring. In heeling them in, select a dry, clean, mellow piece of ground, with no grass near to invite mice; dig a wide trench, lay in the roots sloping, (fig. 63,) and cover them and half the stems with fine mellow earth; fill in carefully and solid all the interstices among the roots; doing this work imperfectly often results in loss—if well performed it never can. If much danger is feared from mice, it is better to place the trees erect in the trench (fig. 64,) and round up the whole surface about them; but, being more exposed in this position, they should be placed in a more sheltered situation from the winds.

Fig. 63.

Fig. 64.

WORK FOR DECEMBER.—The labors of the season having been devoted to the raising of crops, the period for their consumption has now arrived. As it is important on the score of economy to raise heavy crops, so it is equally important now to study the most economical modes of feeding. 1st. The first point of economy is to prevent loss by good and comfortable shelter, exposure to freezing winds not only injures the growth and thrift of animals, but requires a greater amount of food to maintain animal heat. Sometimes the loss of animals, by death alone, toward spring, is greater than the cost of ample shelter. 2d. The second is to feed regularly, that no loss of flesh may be occasioned by impatient fretting. 3d. The third is to give the food in the best condition. Hay and stalks should be bright and not musty. Cornstalks will go much farther if cut before

feeding; but they should be cut very short, or less than a quarter of an inch in length, so as to be fine like chaff; this can only be accomplished by horse-power; it rarely or never pays to cut fodder by hand. Grain should be ground whenever practicable, for animal of whatever kind.

Straw should be carefully saved, even when raised in large quantities, as it has so many uses. It may be employed largely in feeding animals, if a little grain or meal is fed to them regularly at the same time. It may be largely used as a litter, and converted into manure. It forms an excellent covering for large heaps of roots in winter, whether in root cellars or more exposed. It may be employed as a cover for temporary sheds for protecting cattle and sheep. In most cases the best way to manage straw is to thresh the grain as the straw is needed through winter, by means of a two horse endless chain power, which requires but few hands in attendance. If threshed with a larger machine, care should be taken to save the straw from injury; if bound in bundles as it is threshed, it may be more readily handled. The best way to do this is to twist previously a large quantity of straw bands, which may be done by means of the hook and handle shown in fig. 65, the operator taking the handle in the right hand, holding the wooden portion of the hook in his left, and twisting as he walks backwards; the hook is easily made by bending stout wire, or the twisting may be more rapidly performed by attaching a hook to the pinion of a fanning mill. These bands, if twisted of slightly moist oat straw, will retain their twist as soon as dry, and may be cut up into any desired length. When the threshing is performed, place a straw band so that the straw may fall upon it, drawing it into a compact heap, and when large enough, bind it. As soon as the binding is commenced, let a second hand place another band, and proceed as the first has done. In this way two men will bind all the straw that is thrown out of the largest sized machine.

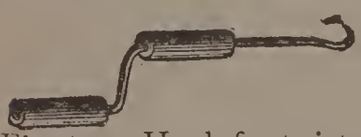


Fig. 65.—Hook for twisting straw bands.

Ventilation.—This is important for all animals, horses, cattle or swine. Foul air, drawn into the lungs, cannot fail to injure its delicate coatings and destroy, more or less, the health of the animal. Many farmers have decided against stables, because of the injury from dirt and bad air. Keep them well littered at all times, and let them breathe a pure air, and a different report will be made. But another opposite evil must be also avoided. Cold currents of air, sweeping through cracks, are sometimes nearly as bad as open exposure, and for this reason some farmers have concluded that exposure is best, after all.

Sheep.—Large flocks should be separated into portions of about 50 each, in separate pens in the shed, placing the stronger in one pen, the weaker in another, each portion being as nearly equal in strength and vigor as possi-

ble. Sheep always do best if fed some grain through the winter, commencing with a very small quantity at first and gradually increasing as the winter advances. Caution in beginning to feed lambs in small quantities is particularly important. An average of half a pint of corn a day is sufficient for full grown sheep—half that for lambs. A good time is to feed them grain at noon, and fodder night and morning.

COLTS AND YOUNG HORSES do well on straw, with a little grain—an excellent way is to cut oats in the sheaf an inch or two long, and feed the whole, grain and straw, together.

GOOD WATER should be provided at all times for all domestic animals, and should be supplied to them frequently and regularly, or at their pleasure. Depriving them of drink for a long time, and then allowing them to drink too much, is detrimental to the best thrift.

MANURE.—The largest and best stables have a central alley passing through them, wide enough for a wagon or horse-cart to pass and carry out the daily cleanings of the stalls. Smaller stables may be cleaned by wheeling the manure out daily by hand. There are different modes of managing manure in winter—if not very strawy, it may be done at once and spread over the fields. On grass land thus treated it will produce a much better effect than if applied in spring, the rain soaking the soluble portions well into the soil and among the roots; an equally good effect is produced if the sod is to be plowed for corn. No fear need be entertained of the manure washing away, except in the beds of streams, as the soil, as soon as thawed, and especially if of a loamey or clayey nature, instantly absorbs the soluble manure. If the manure is quite strawy, it should be placed in large, square piles, that it may rot down, and when the central portion is decayed, the edges should be cut down with a hay knife and thrown on the top. Manure containing little fibre, or litter, should be kept under shelter to prevent waste, but coarse and strawy manure should be exposed to rains to hasten decay. Muck, which has been shoveled out and dried last summer, may now be drawn and applied to yards and manure heaps.

FEEDING RACKS, to prevent the waste of fodder, should be provided for all animals. Stock should be regularly salted; if they have a consant supply, they will eat but little at a time.

SALT TROUGHS for yarded animals are easily made by taking pieces of thick slabs, say a foot long, and boring with a large auger or making a mortise nearly through on the rounded side. These poles contain the salt, and the troughs lying on the ground cannot be overturned.

RUNNING OUT OF FODDER.—Some farmers seem scarcely to know how they will be likely to come out in the spring with a supply of fodder for their animals, and know of no better way than guessing. They should be

more accurate, and determine by calculation early in winter what their supplies will be. If they have not kept a record of the number of tons of hay, it may be determined with considerable degree of accuracy, by allowing five hundred cubic feet per ton of good, compactly pressed timothy, in the lower part of the stack or mow, and six or seven hundred in the upper part, or of clover. Then allowing two and a half to three pounds daily to each hundred weight of animal, an accurate result may be nearly reached, varying in localities where the winter is long or short.

MANURING IN WINTER.—Where manuring has not already been applied by top-dressing, either at the time or subsequent to sowing, it may be done now. See description in November work.

APPLES FOR DOMESTIC ANIMALS.—Sweet apples are of great value in feeding almost any kind of farm animals. Hogs fatten rapidly on them, as well as on those that are acid. Cows, fed moderately at the start, on well cracked or cut apples, to prevent choking, will increase in milk and improve in condition. Apples form an excellent succulent food for horses in winter. Varieties should be specially sought for feeding animals, combining hardiness, thriftiness, and great bearing qualities. Among the best now known are Corlies' Sweet, Pumpkin Sweet, and Haskell Sweet for autumn, and Green Sweet for long keeping. At the West, the Hightop or Summer Sweet is the best early sort, and the Sweet Pearmain and Sweet Romanite for autumn and winter.

APPLES—PACKING IN BARRELS.—When fruit is sold by the quantity, barrels are always best for packing, as well for cheapness and strength as for the ease with which they may be moved without jolting. Apples will keep best if exposed in heaps two or three weeks to open air before barrelling—as some of the exterior moisture escapes, and they become less liable to decay. The few minutes additional time required to deposit them carefully and without dropping them into the barrels, will be many times repaid by the fine condition in which the consumer finds them. There should always be at least two barrels placed side by side when filling; one should be marked "extra," and as the assorting proceeds should receive none but the finest specimens; the other only such as are decidedly good; all the rest, including those that are bruised, scabby or marked with insects, should be rejected for distant market, and used only for home purposes, such as stewing, converting into cider, or feeding to domestic animals. In well managed orchards, where pruning or thinning the branches, thinning the fruit, and proper cultivation have been attended to, this third or inferior portion will constitute but a very small part; in other orchards, grown up with suckers, weeds and grass, and with tops consisting of brush and stunted branches, the labor of selection will be small, for the whole crop will be of this third portion.

Apples should be so snugly placed in the barrels that there can be no rattling when they are moved. They should, therefore, be slightly shaken several times while filling. A little practice will enable any one to do this sufficiently without danger of bruising. The upper stratum should be made as straight and uniform as practicable, and at such a height that the head of the barrel will slightly indent them—the dry wood absorbing the moisture and preventing decay.

A simple contrivance is adopted by packers for placing the head in position, and is shown in the annexed sketch. It consists of a plank, *a*, on which the barrel stands, into one end of which is dovetailed an upright piece of plank, *b*, a little higher than the top of the barrel. A slot, *c*, is cut in its upper end, and a pin runs across to receive the end of the lever, *d*, which may be six or eight feet long. A round board is used as a follower, to be placed upon the head; and across this board is placed a cylindrical piece of wood about three inches in diameter, and flat on the lower side, on which the lever is placed. A moderate pressure at the end of the lever, and a little practice in its use, will enable the operator to bring the head to its position with great ease, precision and accuracy.

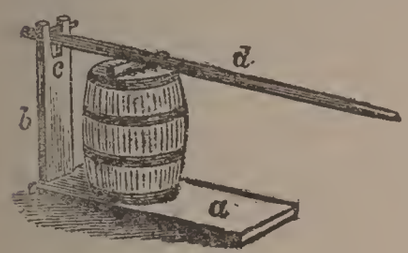


Fig. 66.

APPLES—Use of.—A profitable way of using surplus apples is feeding them to all kinds of domestic animals. Provide a large, dry cellar for them, where the temperature will be a little above freezing during the winter, and they will keep well. Horses are very fond of them; they are excellent for cows, also for sheep and swine, and are about as valuable as carrots and other roots.

ANIMALS—Shelter for.—There is one truth which every farmer who ever winters a herd of any kind of animals, should fully appreciate—and that is, that "*Shelter is cheaper than fodder.*" Exposed animals will consume a third more food, and come out in the spring in worse condition. The loss of animals by death in wintering, when suffering from all the severities of piercing winters, drifting snows, and cutting sleet, is sometimes greater in two or three years than the cost of substantial and comfortable buildings for protection; and the loss of fodder consumed in any case, would in a few years pay for their erection.

Fig. 67.
Poorly Sheltered Horse.

Fig. 68. Well Sheltered Horse.

"There is one change which I now regret that I had not made sooner

than I have, as I would thus have had fewer deaths among my flock of sheep, more milk from my cows, and my working stock in better condition for spring work. I have seen it stated on several occasions—probably more than once in every volume—that it was of great importance to have sheep, and other stock, come to the yard or stables on the approach of winter in good condition, and that it was bad management and poor economy to allow cows, sheep, horses, swine, or any other stock, in fact, to depend wholly on the dry, frozen pastures, as long as snow left them accessible. I had read more than once that it was almost impossible to get an animal that is poor at the beginning of the winter, into any better condition while that season

Fig. 69. Sheep wintered without shelter.

Fig. 70.—Sheep which has been wintered with shelter.

Fig. 71.—Appearance of cattle in spring, well wintered under good shelter.

lasted. But though all these things seemed reasonable, and worthy of being attended to in practice, like some other of my neighbors, readers too of the same facts and admonitions, I neglected to conform my practice to what my judgment approved. This last autumn, however, I resolved to to have my stock in the very best condition before winter should set in, and by feeding cows and sheep a little before they were let out into the fields in the mornings, and a little after coming home at nights, and by

other similar arrangements, I managed to have them all fat, or in a fair condition, when the snow came, and though the fear of not having enough hay to carry my whole stock through the winter, has made us feed rather scantily, they are all in first-rate condition now."

BAG-HOLDERS.—Farmers and others who handle much grain, and who cart off many hundred bushels annually, should by all means provide themselves with a simple stand to hold each bag while it is filled with the scoop or shovel, instead of the costly practice of taking the time of a man or boy to do the work. These bag-holders are made in various ways. One mode is to drive a few sharp nails into the top of a light barrel open at both ends; hitch the top of the bag on these nails while it hangs within the barrel, resting on the floor with its mouth open ready for filling. When filled, it is tied and the barrel lifted off. A much superior way is to provide a board about a foot wide, and eighteen inches long (fig. 72) which serves as a base, on which the bag stands. [Fig. 72.—Bag-holder of forked boards. Fig. 73.—Forked stick bag-holder. Fig. 74.—Board bag-holder]. Uprights or standards with sharp points at the top hold the bag open until it is filled. These uprights are variously constructed. One mode is to take a piece of two inch plank for the bottom, and bore two holes, or one at each corner on the same side, and insert upright or forked sticks firmly into these holes, as shown in fig. 73; another mode is to nail thin boards on the opposite sides of the plank base, sowing a fork in the top of each, so as to form sharp points for holding the mouth of the bag. If these boards are so nailed on to the base that they shall spread a little towards the top, and being thin enough to have some spring to them, they may be slightly bent inward when the bag is attached, and springing out again will hold it the more firmly. One of the best, firmest and most convenient supports, admitting the ready removal of the filled bag, is represented in fig. 74. It has a board bottom, on two corners of which upright board are nailed as shown in the cut, connected and braced by a horizontal board at the top. Through this board are driven nails, projecting upwards and to which the bag is attached. This support is light and the uprights being braced, are not easily broken off. By first measuring the height of a full bag, the right dimensions may be obtained. (The cut is defective in not showing the top board cut away enough to let in the bag sufficiently.)

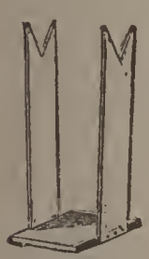


Fig. 72.

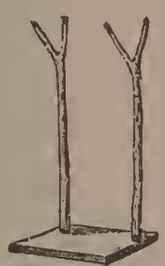


Fig. 73.

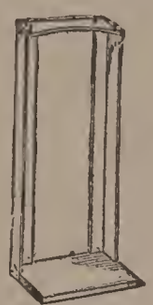


Fig. 74.

BARLEY—CULTURE OF.—In the Northern States it commonly follows corn in rotation, and precedes wheat—or it may be followed by clover, for

meadow or pasture. One of the important requisites is a good fertile soil. If the corn has been well manured, that will be sufficient, but if not, the best way is to *spread* the manure on the land in autumn or winter, that the enriching parts may become diffused by soaking into the soil. A wet soil will not answer, and if rather light or inclining to sandy, it may be plowed in autumn, and only stirred with a two-horse cultivator in spring, as it is important to sow early. But it is better to defer the sowing a little rather than to sow on a hard or wet or badly pulverized piece of ground. No crop needs a more thorough mellowing of the soil, but it need not be worked deep, as the roots are rather shallow. If not possessing a natural underdrainage, it should be thoroughly underdrained, if practicable; but in the absence of this, it is important to provide now, in autumn, plowed and cleaned channels to carry off all the surface water. This will facilitate the early working of the soil in spring. As to varieties, the common two-rowed is most uniformly successful. About two and a half bushels per acre is the common amount of seed. It does best, and ripens most uniformly, if put in with a drill, about an inch and a half deep.

Two modes of harvesting are adopted—one, to cut like wheat, bind in bundles and place in shocks; and the other, and most common, to cut with a machine and rake like hay, and throw into cocks. It is important that it be not subjected to rains, as they spoil the whiteness of the grain and lessen its market value. The use of the wooden barley forks, sold at the agricultural warehouses, facilitates harvesting.

BEEF—How to make cheap.—Many farmers are adopting the mode of disposing of their young animals for beef before passing through the second winter, provided they are fine, well-grown animals, and in this way they have the growth of two summers and but one winter. A correspondent of an agricultural paper gives the following mode adopted by him: "My stock for the last three years has consisted of good Durham grades, and I have just killed my first young bullock, aged 20½ months, and fed as follows:—For the first three weeks he got the mother's milk pure; for the next four months plenty of good skimmed milk, good clover pasture, and nothing else. At the first approach of winter he was taken up, warmly housed, and fed good hay, and 100 bushels carrots, and 12 bushels oats, ground, at 20 cents. This spring he was turned out to good pasture, and got nothing else till Nov. 18th, when he was fit for the butcher; but not wishing to kill him till the weather set in cold, I shut him up to the 11th of December, and fed him hay and meal, at which date he was slaughtered and weighed, the four quarters, 688 lbs, the meat of a first-rate quality and very fat. By this plan of killing early beef I get rid, to a great extent, of one great bugbear, the long winter.

CARRIAGES—Care of.—Those who would keep their buggies and carriages in good order, should place a wrench on every nut at least once a month. This will save nuts, save bolts, and prevent rattling, and wear and tear.

BUSHES—Hook for pulling up.—Since the general adoption of underdraining for wet, boggy or bushy land, it has become an object to remove easily and rapidly the roots of the bushes and brakes which infest such land. Doing the work by hand is too costly and laborious. It may be done by horse power, by means of the instrument figured on the annexed cut. The centre wheels, A, A, are light, and so placed that the puller balances on their axle-tree, in such a way that the heaviest part rests on the cast iron roller, B; the man who holds the handle, C, walks over the land as if he were plowing, and whenever he meets a shrub or brush which is to be removed, he presses on the handles and the points of the puller enter the ground behind the roots, while the pulling of the team will lift the whole forepart of the implement up till the desired extraction is accomplished.

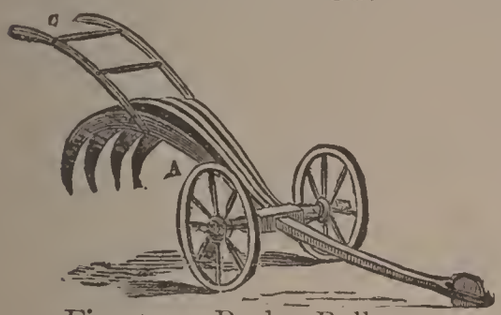


Fig. 75.—Brake Puller.

Bob-sled for logging.—D. B. Raymond furnishes an agricultural paper with a detailed account of a sled which he has used for years in drawing logs out of the woods, and which will turn short corners, and with which a team will start a load and draw one-fourth more than with any other sled. We have not space to give all the details of construction, but merely point out the leading peculiarities, which will enable those familiar with coarse timber-bobs to construct one.

Fig. 76.—Chain Bob-Sleds.

The tongue is not set stiff, but is fastened to the nose-piece with two clevises—one on the tongue, and one on the cross-piece, making a sort of universal joint, permitting it to turn at right angles, and allowing the team to turn half around without moving the load, and to clear trees and logs. The draft-chains being entirely independent of the tongue, the latter may be made light. If used much on the road, it should be heavier and set stiff.

The bobs are coupled together with a forked cable chain in place of a reach, with a grab hook on each end, and a ring in the centre. This ring is put into a clevis at the rear end of the saddle-plank of the front bob, the other ends of the chain to rings on the nose of the rear bob. The rings are large enough for the chain to double through, so as to let them out or draw them together, and by which logs of any length from 8 to 25 feet may

be placed equally on both. The rings, properly put on, cannot catch a tree or brush; and the chains playing up and down, permit the rear bob to go over the roughest ground, logs or brush.

The shoes of the runners are made of the hardest dry wood, sawed slightly across the grain, so as to wear with it. They will last a whole winter. The lower figure in fig. 77 shows how they are put on. The bolster of the rear bob is 4 by 5 inches. The bolt heads which fasten it should be "let in," so as to be out of the way. The bolster of the forward bob is shown in the upper figure of of fig 77, and has rings to bind the load. The saddle-plank, on the front bob, should be $2\frac{1}{2}$ inches thick and a foot wide, to support the king-bolt and whole load.

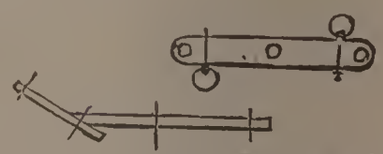


Fig. 77.—Sled Shoe and Bolster.

CLOD-CRUSHER—Use of.—A correspondent states in the Boston *Cultivator*, that the following course is successfully pursued in Scotland with the clod-crusher: It is of course only used on heavy clay lands, which on plowing break up into large clods, and the land must be comparatively free from stone. Tbe soil having been plowed, and left in large clods, a grubber is passed over the whole, loosening up the clods and leaving them at the surface. The grubber, as our readers may be aware, is like a harrow or cultivator, with long hooked teeth, which loosen the soil as deep or deeper than the plow has run. The clod crusher is next passed, which breaks the clods into fragments, at the same time it tends to press the soil too compactly together. An indispensable part of the operation is now to follow with a grubber to loosen the crumbled soil.

We have known a corn crop to be nearly doubled in product by the use of a one-horse clod-crusher between the rows, to reduce the lumps into mellow earth. On undrained clay soils, its use would undoubtedly be often eminently advantageous.

CLOVER HAY—How to make.—A successful farmer writes: Clover should never be cut when wet either by dew or rain. My practice usually is to start the mower, say at 2 or 3 o'clock P. M., and cut until the dew falls. If the sun is very scorching, I begin later in the day. This is put into cock the next day, sometimes before noon, but oftener late, depending upon the weather and thickness of the grass, but always before the leaves get crispy. Sometimes I commence cutting as soon as the dew is off in the morning, and get it up the same day. If the dew or rain fall upon clover while it is green, little or no injury results from it if fair weather follows soon, but after clover is considerably dried, rain or dew cannot fall upon it without serious injury to the quality of the hay.

CLOVER ROOTS—Utility of—On all compact, heavy and tenacious

soils there is nothing better than a crop of clover to loosen and render it friable. Any one who has seen the difference between the state of pulverization in every inverted piece of sward land where only timothy and other similar grasses have grown, and where a dense mass of clover roots have struck down deeply and penetrated every part, will need no further argument on this subject.

WOOD—PILING CORD.—In piling cord wood place the bark side upward, as it will then turn off the water, keeping the wood dryer, and preventing the bark from dropping off and being lost when it is moved.

CATTLE TIES.—The cuts represent chains for confining cattle in their stables. The large ring works up and down a round post, at the side of the manger; the ring being much larger than the post, admits of passing it over a short pin, which is inserted in the post above the height of the animal, on which it will hang until the animal steps up by the side, when the person in attendance takes the ring off the pin and passes the chain down astride the neck and draws the T on the one end of the chain through one of the rings (according to the size of the animal's neck,) on the other end, as shown in fig. 79. This forms a neat, comfortable, and secure fastening—the chains slipping up and down a stationary post, as the animal rises or lies down.

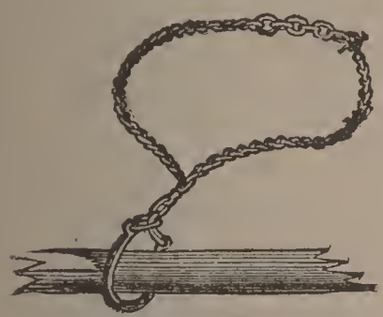


Fig. 78.

Fig. 79.

This mode of securing cattle answers well where there are but few in number, and where there is a good supply of straw, and proper attendance can be given to preserve cleanliness.

CORN CULTIVATING.—Young corn should be cultivated as early as possible, both to push on the crop and to kill the young weeds when they are small and feeble, and have not injured the young plants. An excellent mode of performing this work is to take a Share's harrow, fix handles to it like those of a cultivator, and take out the middle tooth. Two horses will draw it, working two rows at a time, pulverizing the soil perfectly and running close to the plants without throwing the earth upon them. This is especially adapted to corn on inverted sod, and Share's harrow pulverizes in the best manner, without tearing up the turf, as it operates like the roller and harrow combined.

CORNFIELD—TAPE LINE IN THE.—The farmer who does not weigh and measure, is like the mariner at sea without log or compass. He cannot know with certainty whether he is drifting toward loss, or advancing toward gain. He works in the dark. But if he can weigh and measure, he knows what practice to adopt and what to reject—making a difference of many thousands of dollars in the long run. Every farmer should

therefore have and use not only a tape line, but a half bushel, a measured wagon-box, a graduated granary, and especially a platform scale, that he may regularly weigh every animal, to ascertain what food and mode of feeding is most profitable, and weigh every load of grain or of hay, to determine the product and the amount he is going to have to use or to spare, and to know the weight of every animal he offers in market without the uncertainty of mere guess work. There is no way by which a man may learn to be a money-making farmer faster than by this practice.

CORNSTALKS—STEAMING.—A correspondent of the *Country Gentleman* steams his cornstalks in a cheap manner, by first cutting them up in a machine, and then placing them in a bin which holds three hundred bushel baskets. Over every three baskets he throws ten quarts of cold water, and then covers up the whole for twelve hours. Fermentation begins in six hours, and the food steams itself.

CORN FODDER—BINDING.—The strongest and cheapest material for binding up stalks, is the osier willow. The true sort, used by nurserymen, is almost as tough as a rope. It grows easily from cuttings on any rich soil, a row of it two or three rods long, occupying not one square rod, will afford enough to bind ten acres of corn. It should be cut back to the ground every autumn, or else very early in the spring, to keep it young and fresh.

CORN FODDER—CURING.—Corn sown thickly for fodder, always heats and spoils when placed in large stacks, even if dried for several weeks previously. This deters many from raising this excellent and valuable crop. The best way is to cut and bind it in bundles, and place seven in eaoh round shock. After drying several weeks, draw these shocks, and place two together, on ground near the foddering yard. These large or double shocks, if well made, will stand uninjured until foddered out. If placed on grass ground, the butts will not be frozen fast. They might be left in the field till needed in winter, but for the inconvenience of being thus frozen, and the liability of snow or mud in the field. They are most conveniently hauled in a common wagon box, one man handing the shocks, whole and upright, to another who stands in the wagon to receive them, placing in position in two rows. If they have been well bound when put up, with two osiers or straw bands, they will keep snugly together.

CORN—TO PREVENT BIRDS FROM PULLING UP.—As soon as the germinating corn in the planted field makes its appearance, sow corn all around the borders of the field. After a few days walk around the lot; if you find the corn pretty nearly all picked up, sow again. Two applications are sufficient and will last the birds until the growing corn is too strong for them. About a peck at a time will answer for a field of eight to ten acres, unless the birds should be unusually numerous. Timely observation in the field will indi-

cate whether more is needed. I have practiced this method for many years, and have found it effectual.

CORN HUSKER.—A correspondent thinks there will never be a corn husker invented superior to one he describes as follows: It is generally of iron or bone, about half an inch wide, with two holes made in it and a leather strap put in, forming a loop; slip this over a finger of the right hand, and you are equipped. An active hand with this can out-husk any machine that can be made to do it with neatness.

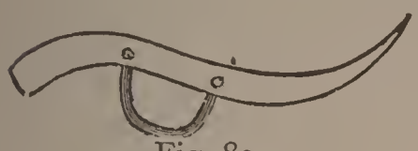


Fig. 80.

CORN FOR FODDER.—Let no farmer neglect at the proper season to sow a plentiful supply. Several years experience enables the writer to say, that at least double the amount of the best fodder may thus be obtained from an acre, over any other known mode, and very often triple the amount. If most meadows which now produce scarcely a ton per acre, were plowed and planted in this way, they would scarcely fail to yield four tons of the best and finest cattle feed, and many would yield five or six tons.

The management of the crop, however, must be of the proper kind, or complete success cannot result. Never sow broadcast—for this requires four or five bushels of seed per acre, to succeed well, is less productive, and does not leave the ground clean. Invariably sow in drills, as follows: Furrow the land (after it is plowed and harrowed,) three feet apart, with a single horse plow; scatter the seed thickly along these furrows from a hand-basket, so that there may be at least forty or fifty grains to the foot. Cover the seed with a two-horse harrow, run lengthwise or crosswise with the furrows, and the crop is in. The only after-culture consists in running the cultivator once or twice between the rows—all weeds will be shaded and destroyed by the crop—and the ground will be left, early in autumn when the fodder is cut, as clean as a traveled road.

The seed may be sown any time during the early part of June—two bushels will be required per acre—and it may be harvested early in autumn in time for a crop of wheat. The stalks should be stacked as dry as pos sible, in small stacks, and well salted, or injury by heating and mould ing will follow.

CORN—HOW TO SHOVEL FROM A WAGON.—An agricultural writer suggests that a board a few feet long, placed standing from the top of the end board to the bottom of the wagon before loading, will allow the shovel to be used at once without any preliminary taking out by hand to reach the bottom. The same is true of potatoes and other roots.

CORN AND PORK—PRICE OF.—The best pork raisers whom we have met with, make a pound of pork from five pounds of corn meal. When pork is five cents a pound they consequently get one dollar a bushel for

their corn. Everything was done in the best manner—good breed, cleanliness, regularity, corn ground and scalded with three pails hot water to one pail of meal, standing twelve to eighteen hours. With what is termed ordinary good management, it requires about twice as much corn, or ten pounds, to make a pound of pork—and the common rule is, corn at fifty cents, makes pork at five dollars; corn at one dollar makes pork at ten dollars, and so on. Scalded meal is worth double corn in ear.

CORN FODDER—CURING AND SECURING.—The fodder should be cut as soon as the edges of the leaves begin to wither. The corn is cut by an instrument represented in fig. 82, and the mode or manner of using it is also shown in the engraving. We have given in the article on "Harvesting Corn" the manner in which to stack corn fodder, but in case the farmer desires to stack the fodder, it should be pitched on the wagon and drawn to the stacking ground, adjoining the winter cattle-yard. In case no ventilators are provided for the stack, then the same must not be very large, not much exceeding in size a common hay cock, or it will heat and become musty. But it is an easy matter to provide ventilators, and the best way is as follows: Select three straight poles, place them up-right (fig. 83) within ten or twelve inches of each other, touching at the top, or better still, place a small block between them. They should spread out at the bottom, the distance being sufficient to make them stand well, with a band around the top to hold them together. The stalks are now stacked around the poles, which being parted, form a kind of chimney for the escape of moisture and heated air (fig. 84 and 85). The stacks should be made narrow and tall, and never contain more than a ton. The farmer who, however, has much barn and shed room may spread his fine corn fodder over the surface of the lofts on top of the hay, but should not be more than three feet deep, and placed sloping, or as nearly vertical as may be. The better the ventilation, and the freer the sweep of air through these lofts. the better and

Fig. 82. Cutting Corn Fodder.

Fig. 83. Poles for Stacks.

Fig. 84. Stack Complete.

Fig. 85. Section of Stack.

more thorough will the drying process be, and to do this the doors and windows should be left open whenever practicable.

CORN—HARVESTING.—An agricultural writer gives the following mode: As the saving of the crop of corn depends a great deal on the manner it is harvested, it is important that the farmer should see that it is well secured against wind and rain while standing in the stack. The following is my method: Cut six rows of corn in each row of stacks, commencing by cutting up the middle row, until you have a large armful, which set up between the two rows cut, tie the top with a stalk, and set it down as you would a sheaf in setting up a shock of wheat. This is the center of the shock, and is not to be tied around a hill; now cut up the other four rows, and as far ahead of the shock as is necessary to make a good sized shock, taking care to set the stalks up straight and to keep the shock round. When large enough, tie snugly around the top (not too near) with a good band of rye or flax straw, and you have a shock that will stand the wind, dry out well, and when pulled down to husk, will leave no stalks standing, as is the case when set up around a hill, or four hills, as some recommend.

CORN-MARKERS.—The *Prairie Farmer* describes a corn-marker which appears to have much to recommend it, to the description of which we add the accompanying cut. Fig. 86.

It is made by putting a short axle in the forward wheels of a wagon, and a long one in the hind ones; couple them together by a six foot stick pinned on to the center of each axle, with two braces pinned on the hind axle, and running to the center of the coupling; the wagon tongue can be put on the front axle by two small iron bolts put through the ends of the hounds and axle; the axles can be made of poles. Put the front wheels four feet apart, and the others twelve feet, though the length of axle can be made to suit. Sixty acres in a day can be marked with it. It runs light and makes a good mark, and one that will show after a rain as good as a sled mark.

Fig. 86. Corn Marker.

There are various modes of marking corn for the straight rows described in the preceding article. One of the best markers is shown in the accompanying figure (87) and consists of three runners, about three feet long, six inches wide, and three inches thick, placed three and a half feet apart, and well braced. A common wagon tongue may be attached to it. The driver walks behind the central runner, and ranges between the horses with his eyes. The rows being three and a half feet apart, he employs stakes ten and a half feet long to range by, and removes them as he passes, measuring accurately their length each

Fig. 87. Corn Marker.

time; or a second person may remove the poles. This marker steadied by the tongue will form very straight grooves in the soil. For cross-marking, employ the chain marker, shown in the cut (fig. 88.) It consists of a light pole, with trace chains suspended from it at distances for each row, or three or three and a half feet apart, as may be desired. Two men take the pole near each end, and one of them acting as guide and ranging accurately, they walk forward, dragging the chains in the soil, making a fine smooth line for each chain. The figure represents only five chains—six or seven may be employed without inconvenience, and the field marked off with great rapidity. By the first of these implements, a man and team will mark more than an acre, and by the use of the second, two men, or a man and boy, will mark two and a half acres in walking a mile.

Fig. 88. Marking Corn with Chains.

There is still another good and economical plan, as follows: Take a piece of tough scantling, set in a couple of smooth round poles for thills, and between these, behind, a couple of old plow handles, or a bow or frame to answer the same purpose. Then set in below, into large auger holes bored for the purpose, thick stout pins, say three inches wide, six inches long and inclining backwards. If the scantling is nine feet long, three teeth may be inserted, each four feet apart, or if eight feet long, each may be three and a half feet apart. If the first row is straight, the rest may be kept so by one tooth passing in the old mark.

Corn shocks.—A good deal of good corn fodder is spoiled because the shocks are not well bound together, and storms throw them down. Large shocks of the husked stalks may be firmly secured by first bringing them firmly together with a rope, attached to a simple contrivance shown in the annexed figure. A small piece of board, A, has three holes bored through it; and a sharp, round, and tapering stick, B, has a crank attached. One end of a ten-foot rope is then passed through one hole and fastened to the crank; the board is placed against the shock, the sharp stick thrust through into the shock, and the rope passed around the shock, and hooked on an iron hook at the other hole, as shown in C. A few turns winds up the rope, binding the whole closely together, when a band is placed around and the rope unhooked for the next.

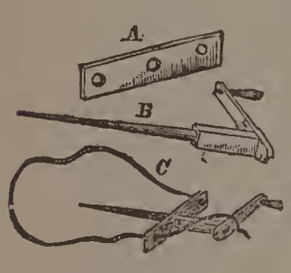


Fig. 89.—Corn Shock Binder.

CORN-FODDER—Cutting.—Cutting corn-fodder an inch or more long, is not good for cattle. A farmer, who had some thirty or forty head of cattle, cut enough stalks in half a day to last them a week, by means of an eight-horse power attached to a cutting machine, adjusted to cut scarcely

an eighth of an inch in length. The stalks were thus reduced nearly as fine as chaff, and were eaten without difficulty. A large part of the sweet portions of the stalks, that are usually rejected and wasted, were thus consumed, and about double the amount of food thus obtained from them. Sweet, well-dried stalks give a great deal of the best feed. Water-soaked, half-fermented stalks, are not good for much, in whatever shape they may be fed. This mode of cutting admits the mixture of meal without difficulty. Cutting by hand is laborious, and does not pay.

CRUST—Break the.—Every observant farmer must have noticed the crust which forms on the surface of newly stirred soils, after lying a few days to the action of the dews. A much heavier crust is formed by each shower of rain that falls. Food and successful cultivation require that this newly formed crust be often and repeatedly broken by the hoe, harrow or other instrument.

A striking instance in proof of the importance of this practice, has just been stated by an extensive farmer. He planted a field of broom corn, and by way of banter, told the man who assisted him, that each should choose a row as nearly alike as possible, and each should hoe his row, and the measured amount of crop on each should be the proof which was hoed best. Our informant stated the result in substance as follows:—"Determined not to be beaten, I hoed my row well once a week the summer through. I had not seen my assistant hoe his at all; but had observed for a long time he was up in the morning before me. A length I found him before sunrise, hoeing his broom corn, and I asked him how often he hoed it; he answered, 'Once a day regularly.' The result of the experiment was, his row beat mine by nearly double the amount."

DRAINING—Advantages of.—An English farmer made an experiment showing the advantages of draining on the barley crop. A stiff clay field had been well underdrained, and it all ripened early and equally, and the barley sold for 50 shillings per quarter. On another field, not drained, the barley ripened unequally, and brought in market only 37 shillings per quarter.

Draining lengthens the season.—Farmers at the North often complain seriously that the seasons are too short for the execution of all their work, and the ripening of crops. A cure for this evil has been found in under-draining. Instead of waiting several weeks for the soil to become dry, they are enabled to plow well-drained land at once, to take time by the forelock, and to get through their work without hurrying, before others have begun. It also enables them to work more economically, by not being compelled to hire extra labor in a hurried season. Dry lands being less

liable to frost in autumn, the crops may continue to grow later and the season can easily be lengthened five weeks.

DRILL MARKS—Advantages of.—The lines made by drilling in wheat, if straight and carefully and regularly made, will be useful in marking out the spaces for sowing grass seed, as well as picking stone, sowing plaster, or applying top dressing, as they remain visible a long time afterwards. Every farmer should therefore place the drill in the hands of a driver who knows how to lay a straight furrow.

DRAINING—Best form of tile for.—Never have a flat bottom for a channel. The discharge gutter at one of our colleges was found to become frequently choked with sediment, and to require frequent cleaning at great trouble and expense. It was made of plank, nailed together, forming a square tube, lying on one of its flat sides. "Turn the tube, so as to rest on one of its corners," said the professor of hydraulics. It was done—and it never became again choked—for the little water which ran through it, instead of being spread out over a broad flat surface, was concentrated into a narrow corner, and swept off all that became deposited there.

EVERGREENS—Transplanting.—When young evergreens have their branches spreading out, down to the surface of the ground, as all evergreens should to look well, it is often quite difficult to dig them up for transplanting, these spreading prostrate branches impeding the work of the spade. Again, when they are set out, the same difficulty occurs in placing them properly in the hole, and filling in the earth. Having recently had occasion to set out a large number from the nursery rows, we found the work could not only be much better done, but in about one-half the time, by drawing the lower branches upwards, pressing them against the tree, and securing them in this position by passing around and tying a cord. The ease with which the operator could now work was remarkable. Nurserymen, who have many such trees to dig, would find it to their advantage to provide a number of small straps to buckle around the trees during the operation of removal.

Evergreens from woods.—Very few land owners plant out a sufficient number of evergreen trees. They furnish some important advantages. They beautify the winter landscape; and, what is quite as important to the utilitarian, they protect from the sweep of cold winds. The farmer who has his dwelling flanked on the most windy points with a dense growth of handsome evergreens, is saved the yearly expense of ten to fifty dollars, in firewood or anthracite. If his barnyard is well protected with evergreen belts, at least an equal amount is saved in hay and grain for his domestic animals. Nor is this all; intelligent cultivators have repeatedly asserted that the increased value of their fruit trees and crops, resulting from pro-

tecting belts of trees, often reaches as high as fifty per cent. on the whole amount.

In some places evergreen trees may be more cheaply procured, by the hundred or thousand, from nurseries. But they may be as often obtained from the borders of woods or swamps. It is very common to lose trees thus procured — which is generally ascribed to *bad luck*, but it always results from bad management. We have set out many hundreds of trees in this way, including White Pine, Hemlock, White Spruce, Balsam Fir, Arbor Vitæ, etc., and never lost a tree that was managed according to the instructions given. The work has been done in autumn, winter and in the spring. There is but one leading and essential requisite; and that is, *to carry a mass of earth on the roots.* The instructions have been to take up a cake of earth large enough to hold the tree in an upright position, without upsetting when placed on the surface of the ground. The larger the tree, the larger, of course, must be the mass of earth.

Let every farmer add to his plantation, in this way, during the winter. A few trees at a time will, after a while, give him plenty of protection. It will frequently be found convenient to do the work during the depth of winter. Young trees taken from along the borders of woods will be better and hardier than those from the center. The covering of snow and forest leaves often protects the soil, so as scarcely to freeze, or to form but a thin crust—just sufficient to hold the flat mass of earth together. A sharp spade easily cuts through this crust, and the trees thus lifted are easily slid, in a standing position, up an inclined plank, and placed on a sled. When large we have drawn them up by a horse, by means of a rope attached to the foot of the stem. If the ground is frozen hard where they are to stand, they may be set upright together, and the roots protected until spring by straw thrown over them.

FARMING—Economy in.—A well-known Western farmer says that a good grind-stone, set true, and run by horse-power, for grinding tools, hoes, spades, and plow coulters, will pay for itself in a month. He makes his men grind their hoes every morning, and take a file with them into the field to sharpen them when they become dull. His men think it extravagant to grind away the hoes, but he can buy a dozen hoes for less than he pays one of them for a week's labor. Tools cost nothing in comparison with labor. It does not pay to give a man two dollars a day to load manure with a dung fork with one or two teeth out. A dull, rusty hoe will cost more in a week than a dozen new ones. Good working horses are cheaper than poor ones. A man and team cost about $600 a year, and it is poor policy to save $100 in the original purchase, and lose $200 or $300 yearly in the amount of work done.

FARMING—To make profitable.—Every beginner in farming, by securing the following essentials, will succeed:

1. Buy no more land than there is capital enough to pay for, with one-third more surplus—for a small farm free from debt, with plenty of means to stock it, enrich it, and carry on its work, will yield more than a larger one, encumbered with debt, conducted feebly in every part, with bad fences, poor implements, bony animals, weedy fields, and thin crops.

2. Lay out the fields in best order, so as to admit a systematic rotation, and to give ready access to every field at all times without passing through other fields.

3. Provide good fences and necessary gates—and valuable time will not be lost in driving out intruding animals, nor crops lost by their depredations.

4. Furnish good farm buildings, to secure properly the crops, and to afford shelter to animals.

5. Select the best animals and the best implements that can be secured for a reasonable price.

6. Bring the soil into good condition by manuring and draining, and keep it so by judicious rotation.

7. Effect a clear and systematic arrangement of all work, so that there shall be no clashing or confusion.

8. Employ diligence and energy, and adopt careful management.

FEED—Cooking.—A successful farmer gives the following directions for steaming feed for stock: How to get a good cover for Mott's agricultural boiler, buy a good tight molasses hogshead; saw the bottom off, say eighteen inches from the head, very true and even; saw a circular hole in the bottom ten inches in diameter, dishing, so that the piece taken out will do for a cover. When you use your boiler, fill it even full of potatoes or whatever you wish to cook; put on the cover, and fill the top full through the trap-door, and if the hogshead is of the right size and fits well to the top of the kettle, so that but little if any steam escapes, you will find a great saving in fuel, as you can both cook one-third more, and do it with very much less fuel, than without any cover or only a loose one. My own is a two-barrel kettle, and I can cook it full of potatoes and pumpkins in two hours, with one large handful of seasoned wood. It is all-important, however, that the apparatus should be well-fitting, so as to preserve all the steam.

FARMING—Improvement in.—In answer to an inquiry at an agricultural meeting, whether the crops generally in the State of New York were decreasing, as some had asserted, A. B. Dickinson said, "there was no truth in the statement. Farmers now raise more than their fathers did;

live better, dress better, travel more, live in better houses, educate their children better, and are in every way more prosperous."

FARMS—To INCREASE THE PRICE OF.—Various motives actuate different land owners in making improvements. But no appeal can be made to them that will be so generally felt as to urge the importance of increasing the money value of their estates. When we say to them that we have a secret to impart by which they may add five, or ten, or twenty dollars per acre to the price which their farms will bring in market, they listen, as they should do, with interest. It is for the purpose of augmenting their property that their labors and exertions are applied year after year. To some of our readers we shall not impart what is entirely new, when we assert that the planting and successful cultivation of fruit trees, and securing a good supply of the best fruit the year round, will do more towards adding to the real as well as the market value of their places than can be accomplished with the same outlay in any other manner. We ought, perhaps, to add that a portion of ornamental planting should not be omitted; for while fruit trees are valued by every one, the addition of a portion for shade and ornament will certainly increase the attraction given by the more substantial and higher market value of fruit trees and their products.

A purchaser visits a certain neighborhood to select a farm. One of his first inquiries is, is it well planted with fruit? If an affirmative answer can be given, he may be induced to pay several dollars more per acre, amounting to five hundred or a thousand dollars for the whole farm—while the trees and planting have not cost more than one hundred and fifty.

There is another consideration of a higher character, namely: the influence of home attractions to the owner's children—an attraction which may prove the turning point between a life of usefulness, industry and domestic enjoyment on the one hand, and of a roving, restless, and perhaps immoral character on the other. But our object at the present moment is to point out the money value of these improvements. The farm will bring a higher price, because it is worth more. Fresh fruit, constantly on hand, will save many dollars yearly in family supplies, and the surplus may perhaps yield a few hundred dollars by marketing. But there is still another point of profit. The owner probably has boys whom he has endeavored to educate to usefulness, and whom he expects will assist him when they grow up, and perhaps take charge of the farm. Now let him figure for a moment between the amount which he would be likely to realize in ten years from his land, if he should be compelled to do all his work, and a part of the superintendence by means of second or third rate hired men, on one hand, or through the energetic and careful management of his own sons, in the prime and vigor of their manhood, on the other. If farming

is made repulsive to them by placing them on a piece of land without a single fruit or ornamental tree, and which will only raise crops of wheat and corn, they will be likely to leave the pursuit and employ their hands at trade or speculation.

FARMER'S TOOLS.—A certain number of tools, and some skill in their use, will often save the farmer much time in sending for a mechanic, and, some expense in paying him. Every farmer should be able to make small repairs on his wagons, gates, buildings, etc. A room, or a portion of a room, should be devoted to keeping these tools; a pin or nail should be inserted for each one to hang on, and the name of each tool written or painted under the pin, that it may be promptly returned to its place, and any missing one detected. Keep every tool in its place—do not wait for a more convenient season, but return every one to its place the moment it is done with. If left out of place a minute it will be likely to remain a week, and cause a loss of time in looking for it. Keeping everything in its place is a habit costing nothing when formed. The tools should be, a hammer saw, augers, brace and bits, gimlets, screw driver, wrench, two planes, chisels, mallet, files and rasp, saw-set, trowel, and a box with compartments for different sized nails, screws, nuts, bolts, etc. Common farm implements and tools, such as hoes, spades, shovels, forks, rakes, scythes, etc., may be in the same room, on the opposite side, and the same care be taken to keep every one in its place.

FEEDING—REGULARITY IN.—Every good farmer knows that any domestic animal is a good clock—that it knows almost to a minute when the regular feeding time has arrived. If it has been accustomed to be fed with accuracy at the appointed period, it will not fret until that period arrives, after which it becomes very restless and uneasy till its food comes. If it has been fed irregularly, it will begin to fret when the earliest period arrives. Hence this fretting may be entirely avoided by strict punctuality; but it cannot be otherwise. The very moment the animal begins to worry, that moment it begins to lose flesh; but the rate of this loss has never been ascertained—it is certainly worthy of investigation, and can only be determined by trying two modes, punctuality and irregularity side by side, under similar circumstances, and with the same amount of food, for some weeks or months together.

There is one precaution to be observed in connection with regular feeding, where some judgment is needed. Animals need more in frosty or sharp, than in warm or damp weather. Hence if the same amount by weight is given at every feeding, they will not have enough when the weather is cold, and will be surfeited when it is warm and damp. Both of

these evils must be avoided, while a little attention and observation will enable the farmer to do it.

FEED—Steamer for cooking.—A Western correspondent, remote from facilities for procuring boilers and cooking apparatus from the East, inquires for a cheap and efficient contrivance that may be manufactured nearer home. A cheap and good boiler may be made of two-inch plank, made into a box, halved together at the corners, and secured by nailing on sheet-iron braces. This box should be of such size that a single sheet of large sheet-iron may form the bottom, by projecting two inches on each side, so as to be bent up and nailed against the sides of the box. This is set on brick-work, forming a place for the fire beneath; the fire striking against the sheet-iron only, and the flue far enough off to secure the wooden part of the box from burning. A board, fitting the inside of the box horizontally, has cleats nailed across the under side, so as to keep it about three inches above the sheet-iron bottom; and these cleats are hollowed up in the middle, so as to rest only on their ends. The board has several holes bored through for the passage of the steam. About three inches of water are poured into the box, the roots or other substance are then placed upon the board, till filled; the tight lid is buttoned down, and heat applied beneath till the steaming is completed. A box of greater length may be used, the sheet-iron covering only a part of the bottom, provided sufficient care is taken to make it tight where joining the wooden portions of the bottom, the iron part only, as a matter of course, being over the fire-place. Or, two sheets of iron may be joined together by lapping like the joints of stove-pipe, and the box thus made double the capacity. The fire-place will economize the fuel in the best manner, if built so that a *thin sheet* of flame will pass beneath the whole bottom, like that in Mott's furnace.

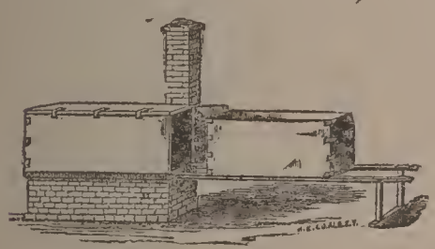


Fig. 90. Steam Boiler.

A steamer was described many years ago in one of the earlier volumes of *The Cultivator*, which possesses several important advantages on account of the ease with which its contents are transferred from one place to another. It is represented in figure 90, where the box on the left is the boiler set on the brick fire-place as already described, but with the flue placed at *one side*, so that a door may open at the end. The right hand box is placed on small wheels or rollers, which run on horizontal rails, running into the boiler, where it is enclosed by the tight door. This box (with holes bored in the bottom,) is run along the rails under the bin of roots, and is quickly filled through a trap-door. It is then run into the boiler, the door closed, and heat applied. The three inches of water is quickly made to boil, and the steaming process goes on rapidly. When completed, the box with its cooked

contents is run out (by hooking into a ring) on the rails, and an iron pin withdrawn which opens its bottom downwards, and discharges its contents into another box placed beneath, and standing beside the feeding-trough. If the rails are of some length, several such boxes may be filled successively, and allowed to cool. No safety-valve is required, as a sufficient quantity of waste steam will escape at the door, even if *list* is applied around its edges to make it tight. If necessary, a stop-cock or two may be inserted into the lower part of the boiler, to show the amount of water, as in the common boilers of a steam engine. The door is set about four inches higher than the bottom of the boiler, to allow space for water.

We cannot state from experience the value of this apparatus, but if there is no drawback, it must save a great amount of labor in handling roots and other food for cattle, which, being daily performed, constitutes a large item in a year.

FEEDING HAY TO ANIMALS.—Much fodder is sometimes wasted by giving too much at a time. The breath of the animals condenses upon it in cold weather and renders it unpalatable, and they refuse it. Feeding often and but little at a time is true economy.

FENCES, CHEAP.—In most of the newer portions of the country, the old-fashioned zig-zag rail fences still prevail, and where timber is abundant, do not cost one-third the amount required for good post and board fences, Many of them are made wholly of rails, without any protection at the corners, and are consequently easily thrown down by cattle, colts, and the wind. A firmer fence consists in the addition of stakes and riders; but the stakes projecting two feet beyond the fence, the whole occupies a strip of land at least ten feet wide. Placing the stakes *upright* at the corners, and connecting the two opposite ones near the top by means of a loop of annealed or small telegraph wire, is a great improvement, occupying but little more than half the ground required for the former. Another modification, equally efficient and as saving of land, consists in placing the riders (for which long poles are best,) in a straight line on the top and at the center of the fence, and then placing upright stakes in each inner corner between the rider and the fence, the lower end merely resting on the ground, and the other wedging closely between the top rail and riders.

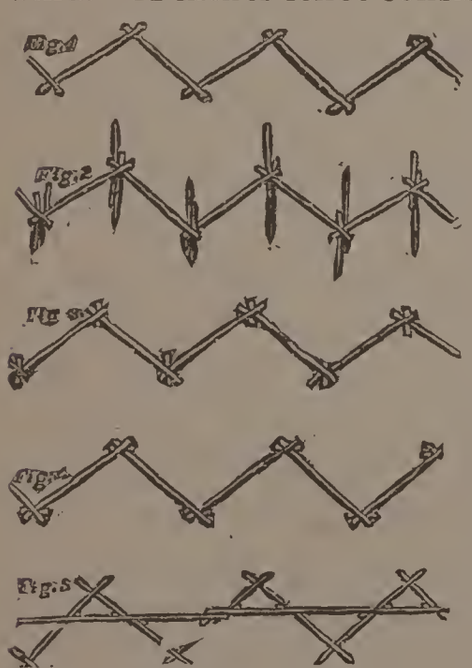


Fig. 91. Ground Plan of Fences.

The accompanying figures, showing the ground plan of each fence, will

serve to make their construction plainer, and to exhibit their several advantages.

Fig. 1 represents the simple zigzag fence, seen on careless farmers' grounds, without any stakes.

Fig. 2 is the common "staked and ridered" fence, somewhat substantial, but occupying too broad a strip of land.

Fig. 3 is a better arrangement, with upright stakes placed at the opposite corners, and the two connected and held closely to their place by a loop of annealed wire.

Fig. 4 is similar to No. 3, but is better, inasmuch as the stakes are placed in the *acute* corners, and therefore maintain their places better, and brace the fences more firmly than if placed in the *obtuse* angles, as in fig. 3.

In fig. 5, the bracing is still more perfect, but the fence has not the neat appearance of fig. 4. In the two last, the stakes need not enter the ground, but may rest merely upon the surface, and hence short pieces of timber, broken rails, or any sticks five feet long will answer, provided they are connected by wire about two-thirds or three-fourths of the height of the fence. These two modifications, then, are more economical in construction, as well as in the length of the stakes, no holes being required for the insertion of their lower ends. Less strength of wire is needed for these, as the stakes are more securely held in the acute angles.

FENCES—Movable.—These are useful to the farmer on many occasions such as dividing large fields temporarily, and enclosing animals on particular spots of ground. They are also useful for inclosing pigs and poultry, for a few weeks among plum trees, during the Curculia season. The annexed fig. 92 shows a mode of constructing hurdles for this purpose, extensively adopted in England, and to some extent in this country. The fence consists of separate frames or "lengths," (one of which is shown by the figure,) with a sharpened post at each end driven into holes made in the ground by a crowbar, and secured at the top by withing together, though the latter is not indispensable. These pieces are made of round poles or sticks split in two, the flat sides being placed next to the cross-bars which are fastened to them by wrought nails at the point of intersection. The points of the posts are driven into the ground to the depth of about 14 to 16 inches.

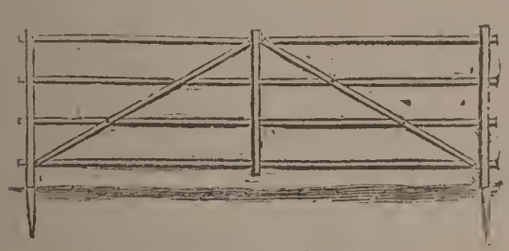


Fig. 92. Portable Fence.

FIRE—Hay stacks, to prevent catching.—If you suspect that the hay when stacked is not sufficiently dry, let a few handfuls of common salt (well dried) be thrown between each layer, which will absorb the moisture, and also conduce to the health of the cattle which feed on it.

JACK SCREWS.—These are often useful, in many ways, to every farmer. Barns, and other buildings, often settle slightly out of position, not only causing injury to the buildings themselves, but also interfering with a free opening and shutting of the doors, etc. A few minutes' use of one of these screws is generally sufficient to set all right. They may be used for lifting any heavy body, and as a wagon-jack for large or loaded wagons.

Fig. 93. Jack Screws.

FARM GATES.—The following has been found an excellent form, and which may be made for about three dollars, including material. The dimensions of every part are added, that the stuff may be procured of the right size and length, and save the cost of cutting away waste portions. It is ten feet and a half long, and the following are the dimensions of the different parts: Top piece, ten and a half feet long, three by four inches at heel, and two and a half by two at latch end, is best made of elm or white oak, but will do of pine.

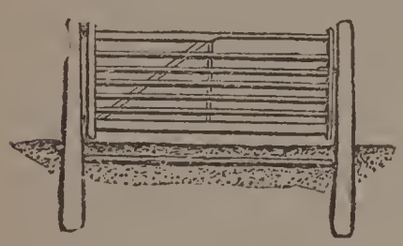


Fig. 94. Farm Gate.

Six horizontal bars below, all an inch thick— the top one two and a half inches wide—the next four three inches wide, and the bottom one four inches wide—all of pine.

Heel piece, four feet eight inches long, four and a half by three inches—head piece, or at latch end, four and a half feet long, and two by two and a half inches—both of oak, or other hard, tough wood.

Two perpendicular braces (one on each side of the horizontal bars, opposite each other, secured by screw-bolts passing through the three,) three feet eight inches long, three inches wide, and three quarters of an inch thick, of white oak.

Two diagonal braces six feet long, three inches wide, and one inch thick, of white oak. The latch plays horizontally or endwise between the two vertical cross-pieces, nailed on each side of two horizontal bars, and through a corresponding mortise in the head piece. The latch is two feet long, two inches wide, and three quarters of an inch thick, of white oak. A vertical wooden spring screwed to the head-piece presses a wooden pin in the latch,

and keeps it shut. It is drawn back for opening the gate by means of another small pin in its upper edge. It makes a very strong gate.

FODDER—GREEN AND DRIED.—The following are the results of experiments made many years ago in New England, to determine the loss of weight by the drying of different grasses. They will prove interesting to graziers. The experiments were made in 1822 and 1823. The white clover of 1822 grew in the shade; that of 1823 in the sun.

		1822.	1823.
100 lbs. green	white clover gave	17½	27
" "	red clover,	27½	25
" "	herds' grass, (timothy),	40	39
" "	cornstalks,	25	25
" "	red-top,		46
" "	couch grass,		48
" "	fowl meadow,		53

FORK—A HORSE.—A correspondent gives the following description of a horse pitchfork, which he thinks has cheapness and simplicity to recommend it: It consists of a simple fork without any latches or springs. The handle is firmly mortised into the head piece, and strengthened by the iron braces at *e*, *e*. To the end of the handle attach the long rope, *a*, which runs through the pulleys. The guy rope, *b*, is attached to the head piece by means of two short ropes, *c*, *c*, of equal length, secured in staples at *d*, *d*. There is no "balancing" to do; but as the fork with its load swings over the beam or into the hay, give the guy rope a slight jerk, requiring but little effort, when the load will drop, the tines slipping out of it, and the fork may be lowered for another. I think it has one advantage over all others that I have seen described, that is, *it is always ready*—no latches or springs to put in place when lowered, but it may be thrust in for another load immediately. There is nothing about it liable to get out of order, and it works with all ease.

Fig. 95. Horse Fork.

FORKS—WOODEN STABLE.—Steel manure forks having sharp points, are very unsuitable tools to be used in cleaning the stalls of horses and horned cattle, except in the hands of men who are always extremely careful in handling such tools. Careless boys in their booby-hood, and heedless men, who are about as liable to thrust sharp fork tines into the animals' legs, as into the bedding beneath them, should never be allowed to have any steel forks in the stable. We have known valuable horses rendered almost worthless simply by a wound in the leg with a steel fork. We have in mind a beautiful horse of a neighbor, which for more than a month was unable to use one leg, into which a fork tine had been thrust when a boy was bedding the horse.

Fig. 96. Wooden Stable Fork.

The preceding engraving (fig. 96) represents a wooden stable fork for forking over the bedding, especially when an animal is in the stall. The head should be made of hard, tough timber, about eight or ten inches long, two inches wide and one inch thick. An old broom handle or piece of a rake handle, will be sufficiently strong for the handle, as the fork is not expected to possess strength for pitching manure. A cross piece may be secured at the end of the handle, if desirable, to enable the person handling it to keep the fork from turning over, when in use. The tines should be eight or nine inches long, nearly round, half an inch in diameter at the large end, and about one-fourth of an inch in diameter at the small end, dressed off round and smooth, so that they will enter the straw easily.

In order to give a suitable degree of "hang" to the fork, let the tines be inserted within three-eights of an inch of the bottom of the head, while the hole for the handle should be bored within half an inch of the upper side of the head. A careless thrust with such a fork would simply bruise the skin of an animal, but make no flesh wound.

GREASE—For the iron axles of carriages, etc.—Ten quarts of water, ten pounds of tallow, one pound of soda, and three and a half pounds palm oil.

GREASE—For axles.—1. Water, two gallons; soda, one pound; palm oil, twenty pounds; mix well by heat and stir till nearly cold, or as long as you can.

2. To two gallons vape oil add two gallons water; soda, one pound; and palm oil, one half pound.

3. To two gallons water add six pounds of tallow; palm oil, twelve pounds, and soda, one pound. Heat to 210 degrees Fahrenheit and stir until quite cool.

4. Tallow, sixteen pounds; palm oil, twenty pounds; plumbago, two pounds. This makes a good grease.

Greasing wagons.—Few people fully appreciate the importance of thoroughly lubricating the axles, etc., of wagons and carriages, and still fewer know what are the best materials and the best methods of applying them. A well-made wheel will endure common wear from ten to twenty-five years, if care is taken to use the right kind and proper amount of grease; but if this matter is not attended to, they will be used up in five or six years. Lard should never be used on a wagon, for it will penetrate the hub and work its way out around the tenons of the spokes and spoil the wheel. Tallow is the best lubricator for wooden axle-trees, and castor oil for iron. Just grease enough should be applied to the spindle of a wagon to give it a light coating; this is better than more, for the surplus put on will work out at the ends and be forced by the shoulder-bands and

nut-washers into the hub around the outside of the boxes. To oil an axle-tree, first wipe the spindle clean with a cloth wet with spirits of turpentine, and then apply a few drops of castor oil near the shoulders and end. One teaspoonfull is sufficient for the whole.

GRASS—How to keep from growing in walks.—When the soil has not been excavated, where the walk is made, to the depth of ten or twelve inches, and the excavation is not filled with stone, gravel, old mortar and other substances, the grass roots on each side of such walks will frequently run into the soil in the walk, and send up shoots so numerous that the walk will be quite green. Make a weak brine and sprinkle the walks, by means of a water sprinkler, as often as the grass appears. A few pounds of salt used in this way will save a vast amount of hard hoeing, and at the same time, keep such walks clean and neat.

Where there are quack roots, Canada thistle roots, or roots of any other noxious plants, it will be quite as well to sow salt along the walks as it would to use brine.

GRASS—Sowing seed without grain.—We have, for some years past, occasionally recommended the practice of sowing grass seed early in spring, without grain. This recommendation has been founded on our own experience. We have never failed in obtaining a good crop of grass the same season when the sowing has been done early enough, with ground in good order. The soil should be sufficiently mellow to cover the grass seed when rolled in. A light brushing has answered the same purpose. To cause a sufficient growth before hot or parching weather sets in, the work should be done about the time the buds of trees commence swelling, and as much sooner as may be convenient.

We find the following statement bearing on this subject in a late number of the *Boston Cultivator:*

"It is a mistake to suppose that grass sown by itself in spring will not yield a crop of hay till the following year. If the ground is in good order and the season is favorable, it will generally give a fair crop in three months from the time it was sown.

Halter for orchards.—A correspondent describes a halter used in the Island of Jersey for cattle running in orchards, as it prevents them from raising their heads more than a few feet from the ground. It is shown in the accompanying cut, (fig. 97,) the wood pieces enclosing the cheek bones, and the loose rope running under or behind the fore legs. It might be occasionally used in this country.

Fig. 97.

HARNESS—Dressing.—Long continued observations show that harness and other leather exposed to the action

of ammonia continually given off in stables, become weak and rotten sooner than other leather. Even when care is taken to protect it with grease, this takes place. Professor Artus recommends the addition of a small quantity of glycerine to the oil or fat employed in greasing such kind of leather, asserting that it keeps it always pliable and soft.

HARROWS—For stony land.—A stout, double, square harrow is often made about as follows: Three timbers on each side the hinges, or six in all, each timber about 4 feet 8 inches long, 3 inches square, or 3 by $3\frac{1}{2}$ inches—five teeth in each timber, or thirty in all, each tooth about seven-eighths by three-fourths of an inch and a foot entire length. The strength may vary with the degree of stoniness, and the teeth may be set back a little, to pass freely; where there are few or no stones, many more and smaller teeth are more efficient.

HAY—To avoid running out of.—Every farmer naturally has an aversion to running out of hay in spring before grass comes. No one desires to buy that which he ought to have raised, to keep his cattle from starving; and the only alternative, when short of fodder, namely, placing them on short allowance, is still worse. The farmer should know, before he enters winter, whether he has enough feed for all his domestic animals. To ascertain this, many resort to past experience, determining as nearly as they can guess—often by a very vague kind of guessing. Those who have kept careful record of tons consumed by a given head of cattle, or a certain number of horses, may determine more nearly. Where the cattle and horses have been weighed, and the aggregate weight of the herd thus determined, the estimate may be made with more accuracy. Some animals eat more than others for the same weight; a greater difference is occasioned by the severity or mildness of the weather, or the degree of shelter given from the cold; but as a general rule, a horse should have three per cent. of his weight daily in food (hay or grain,) and cattle, which digest better, two and a half per cent. If the farmer has ascertained the number of tons of fodder he has deposited in his barn, he may now, if he understand arithmetic, determine pretty nearly how his hay is likely to run, before grass time. If he has no record of the amount of his hay, he may determine very nearly, by measuring. First, by finding the length, breadth, and depth of the hay, he at once knows the cubic feet. Good, solid timothy, the average of a bay, twelve or fifteen feet deep, will weigh a ton to about five hundred cubic feet. If the hay is clover, it will require six hundred or six hundred and fifty for a ton; and if the hay is only five or six feet deep, add one-sixth more. After determining the number of tons, and the whole weight of all his animals, he may at once know if he has enough. The result will, however, be considerably modified by causes which he has more or less at his control. Regularity in

feeding will have its influence; good feeding racks will prevent much waste; and comfortable shelter will save many tons to every large herd. A skillful farmer informed us that formerly, when he had just erected a fine new barn, with ample shelter of the best kind, he had learned, as he thought, according to his usual estimate, that he would have to buy hay to complete the wintering of his animals; but on trying his new sheds and stables, so great was the saving actually effected that he had several tons the next spring to spare.

HEN MANURE.—Several estimates and experiments make the value of dry hen manure, in gardening, about fifty dollars per ton; each fowl on an average consumes about one bushel and three-fourths of corn annually, or a little less than a gill and a half a day; and it has been found that one hen will yield about a bushel to a bushel and a third of manure per year. Various estimates make this worth from seventy cents to a dollar for each fowl. It is very easy to save it, by placing the scrapings or cleanings of the hen-house in a barrel with thin alternating layers of road dust.

HOE—WEEDING.—A correspondent of an agricultural paper gives the following description of an efficient implement for cleaning crops of carrots, onions, etc., fig. 98. Take about eighteen inches of pretty good old scythe, cut the back off, and five inches from each end, bend the blade up to a little more than a right angle. Punch a couple of holes in each end, and nail in a narrow head, six inches long. Put in an old rake-stale for a handle. The blade should stand about two inches outside of a right angle from the handle. To use it—reach out about three feet and draw it towards you, letting it run about an inch deep. It will cut everything clean, and run close to the row. There is nothing like it for killing small weeds, and it will accomplish more than double the work of an ordinary hoe. If you have an old scythe, a chisel and a punch, you can make one in an hour, and next summer, when your onions, etc., get weedy, you will not regret your trouble.

Fig. 98.
Weeding Hoe.

HIGHWAYS.—It is an old-fashioned notion that highways were made to travel in, and belong to the traveling public. A few have discovered the error of this opinion, and now employ them for barnyards by setting their buildings on them—others use them for coarse tool-houses, and pile up old carts, wagons, sleds, rollers, plows, harrows, etc., along their sides—others use them for deposits of rubbish, and throw piles of brush along the fences, and weeds, ashes, leather trimmings, etc., into their centre—others, again, make cattle yards and pastures of them, the cattle helping themselves to their neighbors' cabbages, the horses jumping into their neighbors' wheat fields, the hogs rooting up the grass walk—and all of them terrifying the

little school girls on their way to the district school and returning. We are old-fashioned people, however, and prefer clean, neat roads, and quiet animals in good, sheltered, private barnyards or stables, or in rich pastures with good fences.

HEDGES—TRIMMING.—There has been some discussion, of late years, on the expense and best mode of trimming Osage Orange Hedges, and some have regarded it a formidable item of expense. We have made some experiments and observations on this subject, and give our readers the following results:

Trimming with a stiff scythe is a rapid mode, but as the operator has to strike upwards in order to do the work smoothly, and to prevent breaking and splitting the branches, it is hard and severe work on the wrist. In most of the experiments alluded to, a common corn-cutter has been employed, which has a wooden handle about a foot and a half long, in which a steel blade is set obliquely and about twelve inches long (fig. 99.) With this simple instrument one man has trimmed one-half to three-fourths of a mile of four-year hedge on both sides in a day—cutting it to a peak in the middle, like the roof of a house. A great improvement would be made in this tool by making the handle three and a half feet long, and setting the blade more nearly in a line with it, as shown in fig. 100. The blade of an old scythe, cut short, might be worked over by a blacksmith, so as to answer the purpose well. This length of handle enables the operator to strike more efficient blows, and keep his hands clear of the thorns. The workman we have employed is satisfied he could easily trim a mile or more in a day with such a tool. When the hedge becomes older and higher, the labor probably would be somewhat increased; but two annual trimmings would not probably cost more than one cent a rod.

Fig. 99.

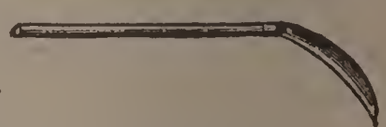


Fig. 100.

HORSE CLEANER.—In muddy weather, the legs and bodies of horses frequently become covered and encrusted with the hardened mud, which, for the comfort of the animal as well as decent appearance, should be scraped off and the hair brushed clean, dry and smooth. A currycomb is too harsh a tool for scraping off the mud, especially around the angular parts of the legs. A much better thing is a very cheap and simple scraper, made for the purpose, either of wood or sheet-iron, and which has been in use many years. Fig. 101 represents a wooden one, which may be made of a thin piece of hard board or the stave of a barrel. One end is rounded so as to be held comfortably in the hand, and the other sloped to an edge. Fig. 102 is a sheet-iron scraper, which is quickly made by any

Fig. 101.—Wood Horse-cleaner.

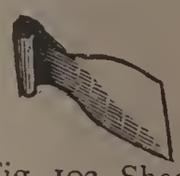


Fig. 102. Sheet-iron Horse-cleaner.

tinker. It is similar in form to the other, but a portion is rolled up at one end to form a handle. In addition to scraping off mud, this sheet-iron slade is useful in hot weather for removing perspiration from the horse's back and sides.

HORSES—Good and poor.—It costs no more to keep a good horse, one that will do a heavy day's work with ease, than a poor one with more bone than muscle, and hard to keep in order. A good, well-chosen team, compactly built, easy keepers, etc., well taken care of, will do one-half more work each day than a bad or common team. Good horses will, of course, pay the interest on the whole cost several times over, and be far cheaper than the others. It will therefore do to pay a hundred dollars or more additional on them. A man whose labor costs three hundred dollars for the season will accomplish far more with fine animals than the cheap ones.

IRRIGATION—Experiment in.—C. L. Kiersted, of Kingston, N. Y., gives a successful experiment in irrigation, in the New York *Agricultural Transactions*. He had four acres of hillside meadow, with rock so near the surface that there was only six inches of soil. The grass was about half a ton per acre. Furrows were plowed so as to take the water from a stream over the highest part, making small outlets from the furrows, so as to moisten the whole land. The result was three tons per acre. The next year the irrigation was neglected "and it was less than half a crop." The year following, the water was let on again, with the same good result. The water was passed over the land twice a week—when indications of the grass lodging appeared, the water was withdrawn, and the crop cut. The cost of watering was about two dollars per acre. Other experiments are equally successful.

LAWN—How to have a good.—Make the soil deep, rich and mellow, sub-soiling or hand trenching, as circumstances may dictate. If not now fertile, work in thoroughly and intimately a large quantity of fine manure, taking the greatest care that this manure be evenly distributed, or else green spots and patches will disfigure the lawn. Sow very early in spring, and roll or brush in a dense seeding of lawn grass. It should be applied at the rate of at least two bushels per acre. If sown very early, it will come up quickly and evenly, and should be mown when a few inches high, repeating the process every week through the season, and it will in a few weeks furnish a fine, handsome close turf.

LAND—Clean.—As a general rule, such grain crops as are good to accompany seeding down to grass, should be put in very clean land. Wheat is an example; it allows grass to grow freely in it; hence the land should be in perfect order, and made clean by summer fallow if necessary, or the stubble will be full of foreign stuff. On the contrary, such as are

unfavorable to seeding down, such as oats, buckwheat, and dense corn fodder in drills, are the best to smother down weeds.

FOREST LEAVES—For litter.—The warmest bedding for domestic animals, especially on plank floors, is perfectly dry forest leaves. They lie in strata, interpose thin plates of air, and thus form a complete non-conductor, and they prevent cold currents of air from passing through. They also form an excellent constituent of manure or compost heaps. They may be easily collected just before winter, in hollows, where prevailing winds have swept them into large beds.

MANURE—Liquid.—This mode of applying manure has one great advantage over the common way of enriching land for gardens. It passes in among all the particles of the soil, and is thus more intimately diffused than any mixture of solid manure in lumps. On all vegetables that require strong fertility, its results are excellent—such plants, for instance, as asparagus, rhubarb, and celery. A correspondent of the *Country Gentleman* says: "Those who would like to try this system in their gardens should sink a hogshead into the earth in a convenient corner of their garden, and liquify guano, hen manure, cow dung, urine, etc., etc., with from six to ten or more times their bulk or weight of house slops, suds or soft water, and after thorough stirring to secure a solution of all the fertilizing elements, allowing the solid or sedimentary portion to settle to the bottom, apply the liquid by a watering can, hydropult, or other apparatus, to the crops after or about sundown."

OSIER—For bands.—Every farmer should have a small plantation of osier for making bands for binding cornstalks, threshed wheat, etc. Rye straw has been extensively used for this purpose, where it is raised and can be procured—but our opinion is that a square rod of the best osier is worth nearly an acre of rye straw. It is also more easily managed, for what a man would carry of the osier in his arms would bind as much straw or stalks as half a wagon load of rye straw. A great deal of time, as every farmer knows, is wasted in trying to pitch with a fork, cornstalks which have been broken, from badly bound bundles. Willow bands, properly put on, would save all this trouble. The osier, or more properly called salix purpurea, may be obtained of many nurserymen, in the form of cuttings, and each cutting a foot long, and two or three years old, or even younger, will soon make a tree, if set in rich, mellow ground, upland or otherwise, provided the soil is well cultivated before setting out and for a few years afterwards.

FIELD CULTURE OF THE ONION.—The following practical directions are given by Henry Pearcy:

The kind of soil.—The soil I prefer is a good sandy loam.

Preparation.—If you have some very rotten manure free from weed

seed, apply forty or fifty two-horse wagon loads to the acre. If you are not sure your manure is free, or nearly free from weed seeds, you had better not apply it, for there will always be an abundance of weeds at best. In place of manure use two hundred bushels of leached ashes to the acre, and plow six inches deep, and then drag and pulverize the ground well; then roll with a light roller to mash lumps, and drag again or rake to make light and fine on the surface. The past year I used a fine-toothed drag, that cut once in two and a half inches, behind the roller, so the ground was finished at one operation.

THE KIND OF SEED AND QUANTITY.—The kinds that I have raised most are the Yellow Danvers and Large Red, principally the latter. The amount of seed per acre will depend on the knowledge one has of its age. I prefer to sow as near three lbs. to the acre as possible, if I know the seed was raised the year previous; if not sure apply more. Last year the writer saw an acre of onions on which there was only three-fourths of a pound of seed put, but the onions were not a third as thick as I generally leave them.

SOWING.—The time I recommend sowing onion seed is just as early as the ground can be properly fitted in the spring. In sowing it is best to drop a seed as often as one an inch, so as to have plenty to come up. If the seed are sown by hand, they had better be mixed with sand or plaster, so that they can be sown without danger of getting too thick. I prefer a drill to sow with, because it sows evener than any person can possibly by hand. In regulating a drill to sow, it is best to try it on a floor, with a slide in the drill that you think about right; if it sows too thick—which you can readily see by counting the seed dropped—substitute the slide in the drill by placing one with a smaller hole, and so experiment till the right quantity is dropped. Cover the seed one-half inch in heavy loam soil, and three-fourths of an inch or more in light soil, and roll it smooth. Sow the rows sixteen to eighteen inches apart, as that is near enough if they grow rank, and it is handier to weed when that distance, after the onions get large.

AFTER CULTURE.—By all means start a hoe or some weed-cutter as soon as the onions are large enough to see the rows. Some recommend sowing radishes with the onions so as to follow the rows more readily.

When the onions are up to four or six inches, thin to one inch if the ground is *very rich;* if medium, to two inches; if poor, to three or four inches. One inch may seem to make near neighbors, but the writer has practiced that plan on first-class soil, and found the onions to get plenty large enough. I have had them yield five bushels to the rod, for a number of rods in succession, but from two to three bushels is a good average. Any time after sowing seed, give as a top dressing (before a rain if possible) equal parts of plaster and hen manure, at the rate of four quarts to the

square rod; and through the season another dressing, the same, or unleached ashes, at the rate of one peck to the square rod.

Charcoal is also an excellent dressing for onions, or if a person has plenty, it would be a good plan to powder it as fine as possible, and apply before plowing. Ever bear in mind to keep the weeds down.

I am aware that some onion-raisers recommend breaking down the tops when the bulb is nearly grown, thinking that it will bottom better. I have always considered that a "granny" notion, and let the tops fall naturally.

HARVESTING.—When a majority of the tops are withered down I take a potato hook and carefully pull the onions, let them lay on the ground till cured, then cut the tops off and market, if the market suits; if not, it is better to place them on a barn floor or some dry place.

RAISING SEED.—In raising seed always pick out the largest or medium sized onions, as near the same shape a possible. When the time arrives for setting out, mark rows as wide as for corn, take a hoe and dig a trench three inches deep, and place the onions eight inches or more apart, and cover and press the ground well. A row of seed can be sown well enough between these wide rows, and will yield well. The object in placing the onion for seed so far apart, is that there may be plenty of room to keep out the weeds. I once planted some onions for seed with the rows not more than sixteen inches apart; the consequence was I could not get among them to weed; when large, up came the weeds and blasted the onion seed. When the seeds are black and begin to get hard, cut off the stalk six inches below the heads, and spread where they can dry; thresh out the seed, and clean as clean as possible with a fanning-mill; then place the seed in a pail of water and stir; the poor seed will arise, which skim off; then spread the seed that settled, in the sun or near a stove to dry, and I will warrant that you will have better seed than can be bought of nine out of every ten seedsmen.

PASTURE—MOWING.—The Boston *Cultivator* says:—We have often spoken of the advantage of keeping pastures free from the dead grass which, where the crop is not fed off, will accumulate. After grass has gone to seed, it is refused by stock, and the patches where it lies will be left, even after a new growth is started. The old grass makes the new sour and unpalatable. To keep the grass sweet, the pasture should be smoothly cleared off at least once a year. On a late visit to the farm of the Rev. C. C. Sewall, of Medfield, he called the attention of the writer and other persons to some hay which he had cut in the pastures. Finding, after many years' experience, that during the flush of feed in the fore part of the season, his cows would leave certain places almost untouched, and which were, consequently, about lost, so far as yielding any return, he mowed them, obtaining a considerable quantity of hay.

PLOWS—To keep bright.—The moment the plow comes from the field after use—for every good farmer brings his plow in after his job is done, and does not leave it in the field—grease the bright mould-board, and other parts, with any kind of cheap grease, which has no salt in it, or with lamp oil. The latter may be best where mice frequent, unless a little arsenic is worked in with the grease, which will soon settle all accounts with these vermin.

PEAS—Harvesting.—There are three methods of harvesting field peas. —1st, by what is termed *rolling*, or the most improved mode of cutting with the scythe, consisting merely of cutting and rolling over the increasing cut portion like a snow-ball, until a bunch is made large enough for a forkfull; this is rather a slow mode. The second mode is simply pulling them with a common horse-rake, leaving them in winrows; but there must be a strip of unpulled peas under every winrow, which makes pitching slow and laborious. The third, and best way, is to pull them with a horse rake, but instead of forming a common winrow, drive the horse one side on the cleaned ground, as soon as the rake is full, and empty it there; then drive into the peas and fill it again. This requires more turning the horse, but is on the whole the most economical of labor.

PORK—Making.—In one respect, farmers commonly show the worst of their management in fattening hogs. These animals appreciate and enjoy cleanliness, yet their owners make them live in dirt, and then charge them with a fondness for filth. This is oppression and slander combined. Every person familiar with their habits, knows that when clean straw beds and other comforts are given them, they are scrupulous to keep them clean. When shut up in a narrow pen, where they must eat, sleep and live in one apartment, they cannot but be uncomfortable; and such a condition greatly retards their thriving. A "hog pen" has become proverbially a repulsive place; this is the owner's fault, and should never be suffered. There is no reason why it should not be neat and attractive. We hear farmers who raise grain say they have more straw than they can use, while at the same moment their fattening hogs have not enough of it to make a dry and clean bed.

Animals can never thrive well unless kept clean. The rule applies to swine as well as to horses. Every one knows that a well groomed horse is better than a neglected one with a shabby coat. Nearly the same result has been found when this treatment is applied to swine. Let every manager lay down this rule, that *a hog pen should never be distinguished by its odor twenty feet distant.* The sleeping apartments should be separate, and be perfectly clean and dry. The other portion should be cleaned out at least twice a day, and the manure at once mixed with muck, loam, coal ashes, etc., to make compost and destroy the odor, which is as injurious to

the health of swine to breathe, as it is to men and women. It is not necessary that a piggery should cost five hundred dollars that it may be kept in splendid order; a cheap and simple structure may be subjected to the most perfect system of cleanliness.

The satisfaction it will afford to the owner, the comfort to the occupant, and the profits to the purse, will be a three-fold compensation.

POSTS, OLD—Drawing out.—When an old fience or gate-way is to be removed, it is often quite a task to draw the posts from the ground. The common way is to dig away the earth for a foot or two downward, and then pass a chain around the post and around a stout rail or a large lever, which is used for drawing out the post. In some instances the insertion of the point of a crowbar into the side of a post is sufficient for lifting it. Both these modes are slow; a more easy and rapid one, using ox power instead of human strength, which has long been in use in some places, is to attach a sufficient amount of chain to the oxen at one end and to the post at the other, place a stout prop between, with its top inclining towards the post, and then let the animals draw—(fig. 103.)

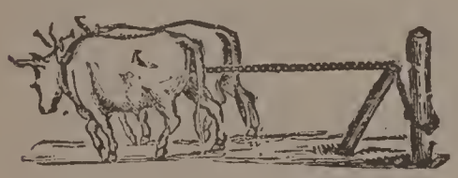


Fig. 103.—Drawing posts.

POSTS—Sagging of.—Every farmer knows what a sagging gate is, and the inconvenience arising from the same. A new gate is built. All goes well the first summer, but he finds after the next spring, that the latch strikes too low, and will not catch in the socket. Afterwards the usage it receives is not the easiest, and in the end the hinges are broken, and the gate lies on the ground.

A commonly recommended mode of obviating the difficulty is shown in fig. 104, a trench being cut between the posts directly under the gate and a piece of durable timber, such as a white oak rail, a locust pole, or a cedar scantling, laid in and compactly covered with earth. The nearer to the surface the better will be the bracing which it will afford; the deeper it is buried, the longer will it last. We therefore think that the more durable the wood is the better, and place it near the surface. This mode of bracing accomplishes the desired purpose partially. Unless the earth is very hard and firm at the lower part of the post, it will slowly yield to the outward pressure, and in process of time the bottom will be thrown out, as shown in fig. 107, and the gate will settle on the ground. A more thorough mode therefore is to dig a deep trench and lay in two connecting pieces, as

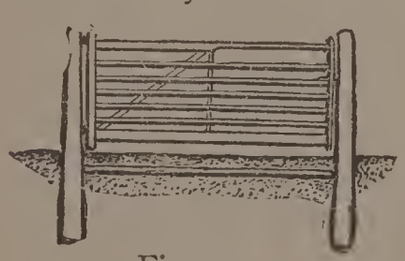


Fig. 104.

Fig. 105.

shown in fig. 106. The bottom one must be dove-tailed into the bottom of the posts, to prevent spreading, and a pin or a few spikes in addition will render the connection firmer. This lower timber, being excluded from air and changes of moisture, will last an age, and the upper one only being likely to decay, will need replacing. By this mode the gate will be sure to keep its place. But it is attended with considerable labor, and an easier mode, shown in fig. 105, will answer nearly or quite as well. Take two pieces of durable timber, (short posts, or an oak or chestnut rail sawed in two,) and place the *ends* against the post in the manner represented, beating the earth firmly about them. If only three or four feet long, they can never be moved a hair's breath by sliding endwise in the soil when firmly placed. Some would prefer to place them across the post, but this is quite a mistake, as earth will thus yield by hard and continued pressure; while no practicable force could move them in the slightest degree endwise. It often happens that such pieces of durable timber are found on every farm, and a moderate degree of labor will cut a short, deep trench on the outer side, and a shallow one on the inner, and firmly place them in position.

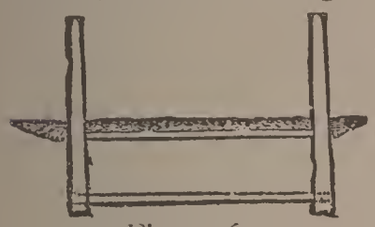


Fig. 106.

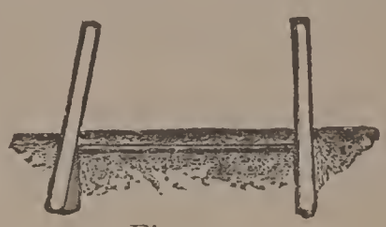


Fig. 107.

POSTS—Gas tar for.—This application is far better than the old mode of charring, and is much more easily applied. Charring only affects the outside, admitting moisture in the interior, and rotting it; the tar, if applied hot to well-seasoned posts, entirely excludes moisture.

POSTS—Durability of.—A correspondent of an Agricultural paper reports an experiment on the durability of posts, which we arrange and condense. The timber used was "yellow oak;" it was cut in winter, and each log was large enough to split into two bar-posts, which were set the following spring.

1st Pair.—Butt end down, one charred. Both rotted off the third year; the upper ends were then put in the ground, and they lasted seven years more.

2d Pair.—Butt end down, one salted by poring and plugging; salted post gave out the second year; the unsalted the fourth year. The ends were then reversed, and each lasted about eight years longer

3d Pair.—One butt end down, the other butt up. The butt rotted off the third year; the other the fourth. The ends were reversed, and the new butt rotted one year before the other, although the latter was set one year the soonest.

4TH PAIR.—Small ends down, one salted. Both rotted off the fourth year; and being reversed, lasted four years more.

It will be seen that the charring did no good, and salting a green post is useless, if not injurious. All the experiments indicate decidedly that posts set reversed last longest; and it appears that seasoned posts last longer than green—the seasoned small ends in the first experiment lasting about twice as long as the green small ends in the fourth.

POTATOES—HOW TO DROP.—Most farmers, when dropping potatoes, render hard work more laborious and fatiguing by the tiresome manner of carrying the basket. By having a basket suspended by a wide strap around the neck, as shown by the illustration accompanying this article (fig. 108,) both hands will be free to drop potatoes; and the aching of arms, so much complained of, when a basket is carried in the usual manner, is entirely avoided. Moreover when the basket of potatoes is suspended by a strap, a laborer will be able to drop the seed with far greater rapidity than if he carries the basket on his arm, as he can then drop with each hand. An active man will usually drop the seed in two drills about as fast as the person by his side, who carries his basket on his arm, can drop in one drill or row.

Fig. 108.—Potato Dropper.

When plucking apples from the trees, by suspending the basket from the neck, as illustrated, a person may clamber in the tree-tops with far greater facility than with a basket in hand, or hung on branches by means of hooks. A piece of stiff wire may be used for making the hooks required at the ends of the strap. On a high ladder, or in a tall tree-top, a person should have the free use of both hands, both for plucking fruit and holding himself in place.

POTATOES—EARLY.—Potatoes may be planted as soon as the frost is out of the ground, and will not be injured if white frost does come after they are up. We make a gain of at least one week in early garden potatoes, by starting them in the end of a hot-bed, setting them out in rows in open ground after they are furnished with green leaves. In one case a white frost cut the tops afterwards, but there were enough left for the plants to grow and give a good crop. They might be protected by newspapers when frost is threatened. The cut pieces were placed in contact in the hot-bed, and buried an inch or two in depth.

POTATOES—PLANTED DEEP.—We tried the experiment one year, on several alternate rows of potatoes, about thirty rods long, of planting a part about two or three inches deep, and another part five inches deep. The

latter invariably produced about 20 to 25 per cent. more potatoes, the treatment in every other respect being the same. They were cultivated flat, which always gives more than when ridged.

POTATOES—KEEPING IN WINTER.—Potatoes spoil in winter if buried, from three causes. First and greatest, want of ventilation. Secondly, and nearly allied, dampness. Thirdly, and more rarely, freezing. Farmers find most of their potatoes spoiled at the top of the heap, where they suppose they became frozen; but this is not the usual cause, the damp, foul, steamy air ascended there, and could not escape, and this spoiled them. A hole made in the top, with a crowbar, and closed with a wisp of straw, would have allowed egress to the confined air, and saved the potatoes. The best way to secure potatoes out-doors, is to make large heaps, say fifty or sixty bushels; see that they are dry and clean, by digging before wet weather comes on; cover them all over with one foot of packed straw, and three inches of earth. The straw will prevent dampness, and the few inches of earth will favor ventilation. A farmer who raises many potatoes, and practices this mode, does not lose a peck, on an average, in fifty bushels. One of the best preventives of rotting that we know of, is in having the potatoes perfectly clean before storing away for winter. Dry weather should be selected for this operation, when the earth has not been soaked with heavy rains, but if mud cannot be avoided, great care should be taken to remove it. To do this, the best plan is to spread them on a barn floor, and they will dry in a few days. The revolving box, represented in the engraving, answers a splendid purpose—the earth and dust dropping through the slits between the boards. One of these boards being hinged and buttoned, admits the potatoes. The motion should be moderate, to prevent bruising. A more perfect way is to provide a longer revolving trough placed in a stream, where it will rapidly wash the tubers in a thorough manner.

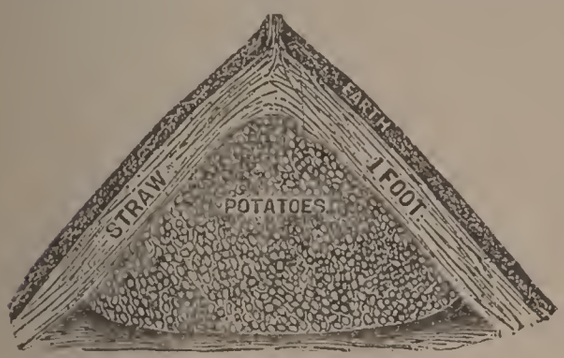


Fig 109. Section of Potato Heap.

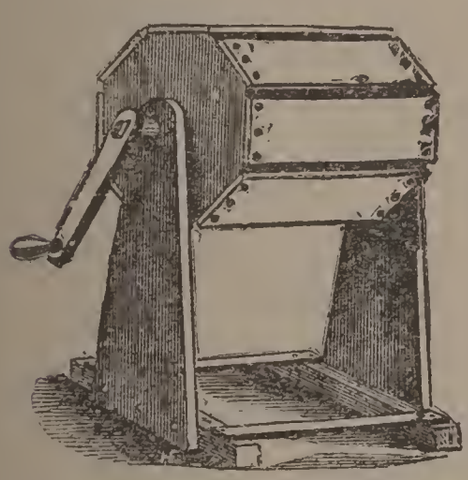


Fig. 110. Revolving Box.

POTATOES—MARKING.—Farmers would save one-fourth of their price by separating the large from the small before sending them to market; the small potatoes only fill up the crevices, and lessen the value of the whole, while when separted, the large ones bring a better price, and the small ones left are of considerable value.

POULTRY HOUSES—How to keep them pure.—Built of brick or stone, poultry houses are apt to be damp. Of wood they are not always warm enough. But the following is a cheap and excellent mode, the walls scarcely allowing the frost to pass. Nail common inch boards vertically; batten with two-inch strips on the joints, outside and inside. Then nail on the inside battens a complete coating of the felt commonly used on roofs under the slate—this felt is very cheap, and a few dollars will line a whole house. [Hollow walls for a Poultry House, *a*, outside battens; *b*, outside boarding; *c*, middle battens; *d*, felt; *e*, inner batten; *f*, lath and plastering.] Then batten again, and lath and plaster on these inner battens. Or boarding may be used instead of lathing and plastering if desired. Here will be two spaces of air in the wall, rendering it an uncommonly good non-conductor, at moderate cost. To exclude mice, fill the space at the bottom six inches with sifted ashes or cement.

Fig. 111.

In a country residence, we find a good position for the hen-house on the division line between the house-yard and the barn-yard. The entrance door for the attendant is from the house-yard; but the opening for the fowls is into the barn-yard, where they can scratch and pick up scattered grain among the straw and fodder.

Every one knows that a brick or flagging floor is too cold in winter for such barefoot individuals as fowls. But a correspondent says he makes a good floor of soil, four inches thick, on a floor of flags. When the droppings fall on a smooth floor, it is impossible to keep the house sweet, as the odor taints the room before they can be swept out. But when they fall on a bed of fresh soil, most of the odor is absorbed. In one corner of the house, away from under the roosts, is a pile of good fresh garden soil. Every day a few shovelsfuls are spread over the floor. The drier this soil, the better it will absorb.

RACKS—Hay and grain.—A correspondent in Indiana has requested directions for constructing a rack or frame for placing on an ordinary farm wagon, to draw hay and grain upon. There are many modes of construction, variously known and adopted in different localities, and possessing various advantages and defects. Among them we have selected two already well known to many of our readers, but doubtless new to others, and which, on the whole, are perhaps as good as any that are used.

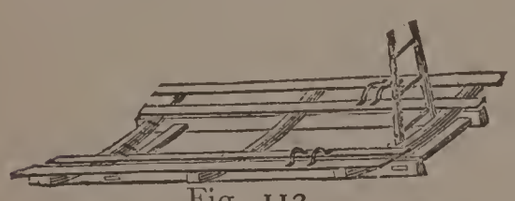


Fig. 112.

Fig. 112 represents a strong frame, the only objection to which is its weight, and the consequent inconvenience of placing and removing it from

the wagon. It consists, first, of a bottom frame (forming the foundation or base,) just wide enough to fit within the stakes of the wagon, made of two side pieces ten inches wide, two inches thick, and about thirteen feet long; these are connected at the ends by cross-pieces morticed through them. On this frame rest three curved cross-timbers, about four inches square and six and a half or seven feet long—the curve may be about six inches, or enough for the boards that rest on them to clear the wheels—if the curve is less, the bottom frame must be wider. These timbers support two boards on each side, each board an inch thick and six inches wide, and about thirteen feet long, or as long as the rack. Stiff, curved iron straps span from one board to the other over the forward wheels, to prevent the hay from resting on the tire. This frame or rack may be modified by making the bottom frame five or six inches wider, and using straight instead of curved cross-timbers, but this will make it heavier, and the load will not rest so securely upon it.

Fig. 113.

Fig. 113 exhibits a lighter and more perfect frame, but requiring more labor in construction. The eight upright pins or standards, connecting a light foundation frame with a lighter one above, renders the whole so manageable that it may be easily placed upon or removed from the wagon. The cross-timbers (consisting of only one at each end,) need not be so much curved—a curvature of three inches is sufficient, and they will be large enough if two and one-half by four inches; their length may be about six and one-half feet, or, if the rack is large, seven feet. The bottom frame may be made of three by five inch stuff, twelve feet six inches long, and the top frame two by three stuff. An inch board a foot wide goes all around the top, the extreme length of which is about fourteen feet. In both these racks the bottom frame must be made just wide enough to fit within the upright stakes of the wagon, which is usually about three feet two or three inches. The short ladder placed at the forward end, to prevent the load from falling forward, and to fasten the reins to during the operation of loading, should be about four feet high.

Another form of construction, is first to make a foundation frame of side pieces about two by eight inches, connected together by four cross-bars morticed into them, nearly as already described, the cross-bars being of white oak or other hard wood, into which oblique mortices are cut on each side, within the side pieces. These oblique mortices receive sloping side frames, which complete the rack—the feet of the side frames being thrust into the oblique mortices, and the frame resting against the top of the foundation frame. This rack is not so substantial as the preceding, but as

the side frames are taken out and put in separately, one person may more easily place the whole on the wagon.

RAIN GAUGE.—The simplest rain gauge is a square or cylindrical vessel, open at top, with a scale marked inside to show the depth of the water as the rain falls. The depth of rains may be nearly measured by simply placing out, on an open piece of ground, a tin pail with parallel sides, and then measuring the depth with a small, thin rule. It is more common, as well as convenient and accurate, however, to make the top of the gauge somewhat in the form of a hopper, throwing the rain together down a graduated tube. The depth being thus multiplied, the amount fallen can be more perfectly measured. If, for example, the tube is one-tenth the area of the hopper, a fall of one inch will show ten inches in depth; or if the tube is a hundred times smaller than the hopper, a tenth of an inch of rain will give a ten inch column. In all gauges of this kind, which multiply the depth, it is safest to have a small cylindrical vessel attached to the side of the instrument to show the fall in case of a great storm, which might more than fill the narrow tube. There are various modifications of rain gauges—one is made by using a funnel placed in the mouth of a jug or bottle, into which all the water immediately runs. It is then poured into a graduated tube and accurately measured. If the quantity will more than fill the tube, it may be measured by successive portions. The most convenient way of placing this gauge, is first to sink a small barrel into the ground, cover it with a wooden board so made as to throw the rain from the centre, where a hole is made just large enough to receive the funnel. The bottle or jug for holding the water is placed in the barrel below the funnel. In the accompanying figure, *a* represents the barrel, *b* the board cover, *c* the funnel, *d* the bottle, and *e* the graduated glass tube, which may be kept when not in use in the barrel.

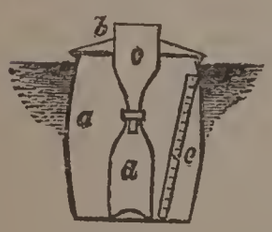


Fig. 114.

Fig. 115 represents a *modification* of the gauge already spoken of, having the tube, *a*, attached to the funnel, *b*, both of which may be made of brass or tin plate. A convenient mode for setting this gauge is to set a short wooden post into the ground, projecting a few inches above it, and then bore a hole in the top of the post the size of the funnel, an inch or two downward to receive it, and then another hole, a little smaller, deep enough to receive the tube. The depth of the water in the tube is accurately measured with a thin whalebone scale. This should be divided by experiment, by placing equal and successive quantities of water in the tube, which will correct any inequalties in the bore. If a heavy

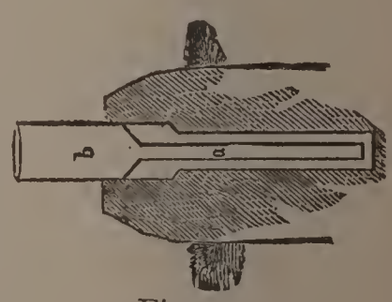


Fig. 115.

rain should more than fill the tube, the excess should be poured off and afterwards measured.

In placing the rain gauge, an open piece of ground should be selected, where buildings or trees will not affect the quantity when blown by side winds, and it should be within a few inches of the surface of the ground, where the fall is less affected by currents.

RAIN—Signs of.—Of these every farmer knows something, but the most infallible of them all is the feeling of the atmosphere itself. This cannot be described, but no man is insensible to it. When the cattle sniff the air, and gather together in a corner of a field, with their heads to leeward, or take shelter in the sheds; when sheep leave their pastures with reluctance; when goats go to sheltered spots; when asses bray frequently and shake their ears; when dogs lie much about the fireside and appear drowsy; when cats turn their backs to the fire and wash their faces; when pigs cover themselves more than usual in litter; when cocks crow at unusual hours and flap their wings much; when hens chant; when ducks and geese are unusually clamorous, when pigeons wash themselves; when peacocks squall loudly from trees; when the guinea-fowl makes an incessant grating clamor; when sparrows chirp loudly and clamorously congregate on the ground or in the hedge; when swallows fly low, and skim their wings on account of flies upon which they feed having descended toward the ground; when the carrion-crow croaks solitarily; when water wild-fowl dip and wash unusually; when moles throw up hills more industriously than usual; when toads creep out in numbers; when frogs croak; when bats squeak and enter houses; when singing birds take shelter; when the robin approaches nearest the dwelling of man; when tame swans fly against the wind; when bees leave their hives with caution, and fly short distances; when ants carry their eggs busily; when flies bite severely, and become troublesome in numbers; when earth-worms appear on the surface.

ROOT—Cellars above ground.—Root cellars may be easily made above ground, that will afford sufficient protection to roots through winter—the requisites being thick non-conducting walls and roof. These walls may be made of different materials, according to circumstances. When lumber is abundant, posts may be set, inclosing the space desired for the roots, and another parallel row to form a double wall. If straw or forest leaves are used for filling in, the space should be two feet—if sawdust or chaff is used, one foot will do. Board up these posts, and ram in dry straw (if chopped it will be better,) dry forest leaves, etc. A sloping or double roof should be made on rafters with boards, and second rafters placed a foot and a half or two feet above. Then fill in between them with straw or leaves. If chaff is used, the space need not be so great as for straw; and if the leaves are

dry and smoothly placed, a foot thickness will do, as they form layers or strata, with thin inclosed plates of air, and are very good non-conductors of heat (or cold.) Then cover the whole with a board roof, to throw off the water, and the building is complete. A door made double and similarly stuffed, admits the roots. When lumber is scarce, build a double log structure, and fill in the space as before—or, if the stuffing should be scarce, build a single wall, and bank up heavily with earth or turf. The roof may be made of poles instead of boards laid closely enough to hold the leaves or straw, but the water soaking in will soon rot it, and it must be renewed. The bottom must be made of poles, a foot from the ground, so as to admit ventilation from below, to keep the roots dry, and allow air to circulate among them, and to allow the soil from them to fall through. There are many modifications that might be made, but the main essentials to be preserved are, viz: to allow the warmth to pass up from the earth below, and to shut out cold from the sides, but more especially from the roofts.

ROOTS—HARVESTING.—In harvesting turnips, carrots, etc., a great deal of time may be saved by cutting off the tops before they are removed from the soil, by means of a small, light hoe, ground as sharp as a knife. Turnips are most quickly removed by a two-pronged tool in form of a hoe, placed under them. If carrots have been planted in straight drills, plowing a deep, even furrow close to and away from the row, will facilitate the work.

CROPS—ROTATION OF.—It is surprising how much more some men will accomplish by dint of good management and shrewd thinking, than others will by dint of hard and laborious toil. A good story is told of a "backwoods" farmer, in whose fields the stumps and his crops held each a sort of doubtful jurisdiction, and who was very much annoyed by the difficulties in contending with these stubborn representatives of the original forest oaks. His boys complained much of the annoyances they met with in plowing and harrowing—the old-fashioned drag especially gave them great trouble by its constant overturning while plunging among the stumps; once in each ten yards of the traveling on an average they were obliged to stop and place it "right side up." "Boys!" said the father one day, when his patience had become exhausted, "take that harrow over to Hammerwell, the blacksmith, and tell him to make the teeth all twice their present length, and sharp at both ends, and we shall see what we can do!" It was accordingly done, and the harrow came back with its teeth as surely pointing both directions as those of a revolving horse-rake. "Now, boys, we will try the new harrow," and it was accordingly set in motion. "Why, father," soon exclaimed one of the sons, "it has upset again, just as bad as before!" "Never mind, go right on without stopping, it will work

either side up." The difficulty was conquered; and the harrowing was speedily accomplished, and without the innumerable delays of "righting the ship."

We have seen some very industrious and worthy farmers whose labors we could not help comparing with this continued toil with the harrow; and others, again, whose skillful management was fully equal to the double acting, double-toothed pulverizer. And in nothing was this difference more vividly exemplified than in the arrangement and ROTATION OF CROPS.

There are other very important requisites in good farming, but they are all accomplished with an increase of expenditure and labor. Manuring, for example, is a most powerful means for improvement; but both manures and their application are expensive in proportion to the amount applied. Underdraining has wrought wonderful results, but the cost is always a large item, and the same may be said in some degree of deep plowing and subsoiling. But in the arrangement of a rotation, no additional expenditure or labor is necessary; it costs no more to cultivate crops which are made to succeed each other judiciously, than to cultivate those arranged in the worst manner possible. The former may bring triple the successful results of the latter—not by the expenditure of five hundred extra days in drawing manure, or five hundred dollars worth of ditching; but simply by making a proper use of one's brain.

It most fortunately happens that no extraordinary originality, shrewdness, or profound wisdom is needed to render available all the advantages of a well devised rotation. The full experience of others is furnished directly to our hands, in the excellent practical publications which have appeared on this subject; and all we have to do is to make use of the materials right before us. It seems surprising, under the circumstances, that so small a number seize the golden prize thus completely placed within their reach—that there are so few, even of those reckoned good farmers, who pursue anything like a systematic succession, to say nothing of such a rotation that shall accomplish its peculiarly beneficial results, namely, preservation of the riches of the soil, destruction of weeds, destruction of insects, and the most advantageous consumption by each successive crop of all the means for its growth within reach. As a consequence of this neglect, we see land overcropped with wheat, the soil worn out for this particular grain, and those troublesome weeds, chess and red-root, taking its place. We see pastures, left unplowed for a long series of years, become filled with "buttercups" and ox-eye daisy. A disproportion of spring crops facilitates the spread of wild mustard, and among insects, grubs and wire worms increase according to the cultivation that favors their labors. It appears to be but little understood how great is the assistance to clean cultivation afforded by

a good rotation. The best example of this sort we ever witnessed, where every field of the symmetrically laid-out farm, except a wet meadow was brought under a regular, unvarying system, scarcely a weed was ever to be seen; and we ascertained that not one-third of the labor usually expended, was required for the hand-dressing of hoed crops. The alternation was such that the whole operated like a two-faced harrow—the culture of each successive crop constantly tended to the destruction of some weed injurious to another, and thus all were destroyed in their respective turns; while at the same time the fertility of the land was increased and each crop fed with its own proper nutriment as its turn came round.

Systems of rotation must vary according to the nature of the soil in different regions of country, the amount and kind of manure at command, the cleanness of the land, the nature of the market, and the proper distribution of labor. One of the best farmers we have known, had his farm laid out in equal fields, and adopted the following rotation:

1st year—Wheat after clover.
2d " Corn, potatoes and ruta bagas, with all the manure made that year.
3d " Barley.
4th " Wheat, seeded with clover.
5th " Clover pastured.

A piece of low ground was kept for meadow, and was occasionally top-dressed, and rarely broken up and reseeded. A rougher portion of the farm was occupied with summer-fallow, wheat, clover, and grass for pasture. This farm was a strong fertile soil; poorer land would need a longer season in grass, which would admit a larger number of live stock, and as a consequence produce a greater amount of manure.

The following may be adopted, with variations according to circumstances:

THREE COURSE SYSTEM.

1. Corn and roots, well manured.
2. Wheat.
3. Clover—one or more years, according to fertility and amount of manure at hand.

FOUR COURSE SYSTEM.

1. Corn and roots, with all the manure.
2. Barley, or peas, or both.
3. Wheat.
4. Clover—one or more years.

Oats are always a severe crop, and an excellent farmer of our acquaintance who adopts the above, never permits oats to grow on good wheat land, but confines the crop to the more moist portions of his farm, adapted only to this and to meadow and pasture.

DAIRY DISTRICTS—ROTATION OF CROPS FOR.—In a strictly dairy region of country, the production of the grass crop—pasture and meadow—is the one great subject of interest; consequently the rotation of crops, the profits of grain raising, etc., attract but little interest. If we keep our cows well, all we care to sell is our butter and cheese. If our meadows fail we plow them, taking up the parts most run out, plant corn on the sod, and seed down the next year with oats or barley, so that each year we have Indian corn and oats or barley to feed to our cows; and we buy our flour. Some dairymen, it is true, sell their coarse feed, but the dairy suffers, no doubt, to a certain extent.

RURAL ECONOMY—SHORT RULES IN.—1. Paint all tools exposed to the weather, and if with a light colored paint they will heat, warp and crack the least in the sun.

2. Dip well seasoned shingles in lime, wash and dry them before laying, and they will last much longer, and not become covered with moss.

3. In hitching a horse to a common rail or worm fence, always select the inside corner, which will be more secure by its bracing position, and the halter will not become tangled among the projecting ends of the rails, as when hitched to an outside or projecting corner.

4. Always tie the halter by making first a single loop and then thrusting the end of the halter through this loop. This is quickly untied, and will never become untied of itself.

5. Dip the tips of nails in grease, and they will easily drive into any hard wood, where otherwise they would double and break.

6. In screwing nuts into any part of machinery, in cold weather, be careful not to heat them first by the hands, or they will contract, after being screwed on tight and become immovable afterwards.

7. In plowing or teaming on the road in hot weather, always rest the horses on an eminence where they may receive the cool breeze, and where one minute will be worth two in a warm valley.

8. In setting out young orchards always register the varieties immediately in a book, where they may be referred to in a few years when the trees commence bearing and after the labels are lost and the names forgotten.

9. In laying out gardens for fruits and vegetables, place everything in drills or rows, so that they may be cultivated by a horse, and thus save the expense of hand labor.

10. Plant a patch of osier willows on every farm. A rod square will furnish as many bands for binding cornstalks, straw, etc., as an acre of rye straw.

11. Remove every stone from the track in the highway. A single pro-

jection, which might have been removed in one minute, has battered and injured a thousand wagons, at a damage equal to a hundred days' labor.

12. When board fences become old, and the boards begin to come off, nail upright facing strips upon them against each post, and the boards will be held to their place, and the fence will last several years longer.

13. Always set a post fence over a ditch, or near good drainage, and the posts, always remaining dry, will last many years longer than those standing in wet sub-soil.

14. In writing on wooden labels or marking sticks, with a common pencil, if the wood is first wet, the mark will last two years; if written on dry, one or two rains will wash it all away.

15. Always keep a supply of copper wire on hand, of different sizes, for repairing tools—it is greatly superior to either twine or iron wire.

16. Every farmer should have a neat tool room, against the smooth walls of which a suitable place should be provided for hanging up every tool. An accurate outline of each tool should be painted on the wall, to remind every man of its absence, when left out of place.

17. Oil paint, applied to houses and barns, out-buildings and fences, will last much longer, and harden better, if put on as late as the middle of autumn, instead of during the heat of summer.

18. Every bin and granary should have a scale, or upright row of figures marked inside, showing accurately the number of bushels to fill it up to each figure. This will enable the farmer to know at a glance how much grain he has raised, or has on hand.

RUST—PREVENTING.—Plows should be kept bright and ready for use in spring. These, as well as all cutting tools, may be preserved from rust by a very thin coating of grafting wax—which will be very convenient for all those who are in the practice of doing their own grafting. Those who have no grafting wax may take three parts of lard and one of rosin and melt them together. This will make an application more easily applied than the wax, and which will answer an excellent purpose.

SAWING AND THRESHING BY HORSES.—S. E. Todd gives the following statement in the *Country Gentleman* of his success with an endless-chain two-horse power: I can saw three cords of wood per hour with two horses, with a circular saw; and with a drag saw, with no help but a boy ten years old, I sawed off logs twenty-six inches in diameter in seventy-five seconds per log, including starting and stopping time; drive my grist-mill, clover machine and horse corn-sheller, with which we can shell, clean and deliver in the bag, ready for market, seventy bushels of shelled corn per hour; and by driving business a little, we could do more than this. But this is ordinary work, with an ordinary elevation of the power.

Two years ago I had a good crop of barley, and could not get it half in the barn; and so we would haul a load to the barn, and put the horses on the power, and thresh it about as quickly as we could pitch it up into the mow, and with the same help that was necessary to merely unload it.

For several years past I have raised more or less buckwheat, and by having a horse power and thresher of my own, I was enabled to get my buckwheat all threshed before my neighbors had really thought of threshing theirs. Last fall was a very unfavorable autumn for securing buckwheat; but as soon as the buckwheat appeared at all dry, we could thresh; while my neigbbors lost full one-half of their crop before they could possibly get it threshed. But this is not all. As my buckwheat was secured before it had become water-soaked, it would make much better flour, and millers were willing to pay from four to five cents more per bushel than they would pay for that which had been exposed to storms for several weeks.

My thresher stands on the second floor of the barn, and the grain falls on the first floor. Therefore, all the help that is needed is a boy to keep away the straw, which a very small boy does with ease, and one to feed, and one to pitch the grain off the wagon. As a general thing, I thresh my grain in the winter, when we have but little to do, and when we can use up the straw economically.

SCALDING TUB.—An agricultural writer describes a very convenient scalding tub, as follows: It consists of a box twenty-four inches deep, thirty inches wide and four feet six inches long. One end is put in slanting at an angle of forty-five degrees. In the slanting end put five hard-wood rollers, one and a half inches in diameter. These rollers are held in their places by two hard-wood sticks two inches square, securely fastened to the sides of the box. The rollers should have considerable play, so as to turn easily. The timber used should be 1½ inch pine. There are three advantages of this box over the round tub—it being much cheaper, requires less water, and is labor-saving. One man can scald a three hundred pound hog alone, with as little hard lifting as two can in the old-fashioned tub. It should be made tight and strong.

SEED, GRASS—Testing.—It is of great importance in seeding down to grass, to cover the whole ground with a dense coating of herbage, with no bare spots. To do this the seed must be good. It may have been injured by age or mouldiness, or have been imperfectly ripened. Hundreds of dollars may be lost by not knowing good from bad seed. To test it, count a given number of seeds, and sow them regularly in a pot or box of fine earth, covering them a fourth or half an inch deep, according to size, by sprinkling on fine earth. Keep them moist and warm, and count the number that grow, or they may be sprouted between folds of moist cotton.

SEED—QUANTITY REQUIRED FOR AN ACRE.

Wheat,	1 1-2 to 2 bushels.
Rye,	1 1-2 bushels.
Oats,	1 2-2 bushels.
Barley,	2 bushels.
Peas,	2 to 3 bushels.
White Beans,	1 1-2 bushels.
Buckwheat,	1-2 bushel.
Corn, broadcast for fodder,	4 bushels.
Corn, in drills for fodder,	2 to 3 bushels.
Corn, in hills,	4 to 8 quarts.
Broom Corn,	1-2 bushel.
Potatoes,	10 to 15 bushels.
Beets,	3 pounds.
Carrots,	2 pounds.
Ruta Bagas,	3-4 pound.
Millet,	1-2 bushel.
Clover, White,	4 quarts.
Clover, Red,	8 quarts.
Timothy,	6 quarts.
Orchard Grass,	2 bushels.
Red Top,	1 to 2 pecks.
Kentucky Blue Grass,	2 bushels.
Mixed Lawn Grass.	1 to 2 bushels.
Tobacco,	2 ounces.

SHOVEL—HOW TO HANDLE A.—The illustration herewith given (fig. 116) represents a laborer shoveling with the handle of the shovel across one knee, which is the fulcrum, the weight being on the shovel, and the power, the hand, near the end of the handle. By placing the handle across one knee, the shovel is driven into the material to be shoveled, by a forward motion of the body, which requires very little muscular force. Then, by a downward thrust of hand near the end of the handle, the weight is raised one foot more, with the expenditure of a very limited amount of muscular force.

Fig. 116. How to Handle a Shovel Easily.

This principle should be explained to boys and awkward laborers, both when they are pitching manure, or shoveling earth; and at the same time, the fatiguing labor of shoveling, or pitching away material with a tool having a short handle, should be fully explained. With a short handled fork or shovel, the labor must be performed almost entirely by muscular force, which causes great fatigue to perform but little work. There is another consideration worthy of notice, which is, when a laborer bends his body over to lift a shovelful of earth, the fatigue caused by only the motion of the body will frequently be fully equal to the fatigue produced by the labor performed.

This thought, will doubtless be sufficient to prompt laborers, when shoveling or forking, not only to have tools of the most desirable form and dimensions, but to learn how to use them most effectively and with the least fatigue.

STACKS—Propping.—A well and evenly built stack of hay, straw or cornstalks, will keep its place and stand perfectly erect. But bunglers often build stacks which settle to one side—a result which is almost sure to occur if the load is always driven on the same side in building; or if the builder is not careful to place regular tiers of forkfulls, while he ascends, like the tiers of brick in building an edifice. Stacks made in this way in a short time begin to nod, and lean in some particular direction; the next step is to thrust rails, in the form of props, against the lower side, to prevent further settling or upsetting. The points of these punch into the stack and very little good is done. A better way, well-known to some, is first to place a plank, slab or broad rail, agaist the side of the stack against which the prop may be set (fig. 117.) A slight notch may be cut, to prevent sliding. One prop thus .inserted, is worth half a dozen placed in the common way.

Fig. 117. Propping badly built Stacks.

STABLES—Damp.—A farmer discovered after taking possession of a newly purchased place, that his horses were becoming poor, diseased, and incapable of much labor. His cows became sickly, their milk diminished, the butter was bad, four lost their calves, and two died of scours. The dampness of the stable was the suspected cause. It was low, under trees with a northern aspect. It was replaced by another on a dryer spot, when the difficulty ceased.

THISTLE DIGGER.—A well-known writer describes a useful implement for extirpating thistles and simple weeds from grass lands. It is easily made, cheap, and will last. *A*, (fig. 118) is the handle; *B*, the claws, between which the thistle is received; the curved iron for *C*, is the fulcrum by which a purchase is obtained for extracting the root. D, is an iron rod or bar, upon which the foot is placed to thrust the claws into the ground. In case the root of the thistle breaks, while endeavoring to extract it, the implement is inverted and the curved blade, *E*, which has a chisel-like end, is thrust into the ground in order to cut off the root some inches from the surface, and thus prevent it from vegetating when the ground is a little moist or loose This implement, in the hands of an active man, will take out a large number of plants. It makes sure work, and when the land is not overrun with the weeds, it is the cheapest way to get rid of them. Boys like the sport of prying up the plants and the implement should be made light and handy, so as to give them a play at "the thistle business," when they feel inclined.

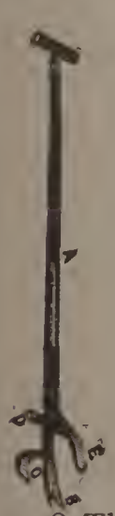


Fig. 118. Thistle Digger.

TIMBER—Cutting, time for.—We have long been satisfied that the

best time to cut timber is in summer, provided it is not left in the log, but is immediately worked up into boards, rails, or whatever is intended. It dries rapidly, and becomes hard and sound. Cut and saw basswood in summer, and in a few weeks it will become thoroughly seasoned, and will finally harden so as to almost resemble horn. Cut it in winter, and it will be so long in seasoning as to become partly decayed before the process can be completed. No doubt the presence of the water or sap in great abundance in winter, and especially toward the latter part, hastens this incip ient decay. Rails cut and split in summer, and the bark peeled to hasten drying, have lasted twice as long as winter-cut rails.

TIMBER LAND—Planting.—It is said that thirty years, at the present rate of cutting and slashing, will sweep off all trees fit for lumber east of the Mississippi. We must raise young timber. If we allow second growth to spring up, ten acres of fertile land, well managed, will supply a family with fuel; five more will fence a medium farm. On poorer soils, none will be required. It is to be cut once in twenty years.

But in spontaneous growth, we have not a choice of the best timber—we have to take it as it comes, good and bad. It is better, also, to plant in rows, and then a wagon may be driven easily through any part, in drawing out the timber. Plant alternate rows of locust, chesnut, and European lark. If one does not happen to succeed well, the other will have a chance, and the land will still be occupied.

By planting in rows and cultivating the trees while young, they will grow five or ten times as fast. They may alternate with hills of potatoes or beans on the start, and two rows of potatoes between each row of trees. The next two years the same, or keep the ground clean, mellow and bare. Then corn, if the trees don't shade all the ground, as they probably will.

Locust seed will not grow, unless boiling water is poured on, and allowed to remain some hours. The swollen seed will grow; the rest must be scalded again. Chesnuts will not grow if the shell becomes dry--keep them moist from the first and they will. Both should be planted in hills like corn, and thinned out, but not transplanted. European larch may be had cheaply from English nurseries.

TIMBER—Raising young.—The rapid and almost entire disappearance of the original forests of the several States, and the great increase in price of timber, indicate the importance to every considerable land-owner, of allotting a portion of his farm to the growth of new timber. The following rules should be observed.

1. Where old woods are cut down the new growth will spring up the best by making a thorough clearing as far as any of the trees are cut.

2. The young and dense growth which now springs up will afford much

more and better timber by being properly thinned out and trimmed every few years—the part thus cut out proving a valuable crop each time.

3. Different rules have been given as to the distances of thinning; but the more common opinion is that young trees should not be allowed to stand nearer together than one-third of their height. The thriftiest and straightest trees should always be left, and the distances asunder be nearly uniform. The superiority of timber-land thus treated, both in the amount and quality of the timber, over such as is entirely neglected, would be surprising to any one who had never before witnessed it.

4. The most profitable period or age for cutting, as indicated by ample experience is about twenty years; a less average yearly return will be obtained if shorter or longer periods are selected. Well managed timber land on medium soils will produce at this age about twenty cords per acre, or one cord per acre annually. A farmer therefore may obtain a supply of fuel equal to twenty cords yearly from twenty acres of woodland; or an equal amount of more valuable timber.

5. A larger amount and more valuable returns might be obtained from land specially planted in the first instance with the most valuable kinds of trees. They might be planted in the first place on cultivated soil, in alternating or occasional rows with corn, or other drilled crops. The cultivation given would cause a rapid growth while the trees are young; the thinning might be more systematically and perfectly performed; wagons could pass with perfect facility for drawing off the timber between the straight rows; and the rows, when once established, would remain perpetually, the trees sprouting up from the stumps at each cutting.

THERMOMETERS.—Every house should be supplied with several thermometers. Apples will keep better in a cellar with a low temperature, which may be maintained, if one or two thermometers are always at hand to indicate the approach of freezing. They are always of use in dairy and other departments.

TOOL—A CONVENIENT.—A well known agricultural writer sends the description of a convenient stable tool, and urges its use. His description is as follows: The combined stable rake and scraper is shown in fig. 120.

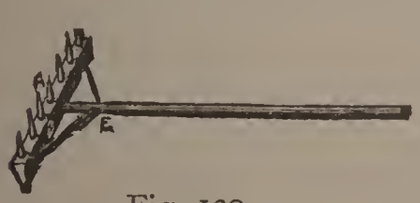


Fig. 120.

The head *b* is made of hard wood, 14 inches in length, 4 inches wide, and 1½ inches thick, at one side tapering to ¼ inch in thickness. Six or seven ¾ inch holes 2 inches in depth, are made upon the wide side, in which are inserted sharpened hardwood pins, *a*, projecting 3½ inches. The handle *e*, is 4½ feet in length, and braced as shown, with the upper or sharpened pin edge the best and unsoiled bedding can be hauled up in the stall, or it may be used

for pushing out the refuse straw and manure that is quite difficult to handle with the smooth edge of the tool, which it is necessary to use for scraping out the finer parts. This tool enables the farmer to do the same work in considerably less time than without it.

TYING MATERIAL FOR FARMERS.—There are two materials used for the various purposes of binding and tying, which every farmer should be supplied with- One of these used for gardening purposes, tying up trees and plants, ligature for bedding, etc., is the prepared basswood bark. This is very easily manufactured, and may be procured in abundance wherever basswood is used for timber or saw-logs. Remove the bark when it will peel freely, and place it under water immediately before it dries any whatever. A moderately running stream is best, as it carries off the foul odor otherwise arising. It is best to place it in masses or beds, and sink it by means of stones. In ten days or so the inner or smooth bark will peel off handsomely in stout ribbons, and should be hung up to dry. The remaining bark may be sunk again, and in a fortnight will afford another and coarser peeling.

The other material, valuable for binding cornstalks, corn shocks, threshed straw, and other purposes where strength is needed, is the ozier, such as nurserymen employ for packing trees—the best sort for this purpose being *salpurpurea*. The same quantity will grow on a square rod or acre for binding purposes as may be obtained from a rod or acre of rye straw. It should be cut down every spring to the ground, and the young shoots which numerously spring up constituted the tying material.

WAGONS AND CARRIAGES—TO MAKE LAST LONG.—Keep them clean and well screwed up. A carriage allowed to become dirty, loses its paint, cracks, admits water and decays. If dirt is permitted to collect on the hubs, it works inside, mixes with the grease, and grinds out the works. The wheels soon work loose and the evil increases. If the nuts work loose, the parts rattle, wear out, or break. Place a wrench on every nut, if the wagon or carriage is in use, as often as once a week. Keep all parts well washed, well painted, and well varnished. Always place them under shelter when not in actual service.

WALKS—GARDEN.—There is no part of gardens or pleasure grounds more expressive of the character of the keeping than the walks. No matter how fine the flower beds may be, if the walks are not bounded by smooth and graceful curves, or if they are rough, irregular and unfinished, the grounds will convey unmistakably an expression of bad management. But a smooth and perfect walk, on the other hand, even if carried through a wild natural shrubbery, imparts a finished air to the whole. These facts should be borne in mind by all owners of ornamental gardens.

WATER BARREL—A PORTABLE.—On almost every farm there is usually a large quantity of water to be transported from place to place, which may be greatly facilitated by simply hanging a water barrel between two light wheels, as represented in the illustration herewith given, fig. 121. A pair of the forward wheels of a light carriage would be just what is needed. A strong cider, beer or oil barrel may be used, by cutting two square holes through the staves, to receive the axletree, which should fit closely to the orifices, and be secured with nails, having the very small cracks stopped with pitch, or beeswax and tallow. In many cases a farmer could carry one or two barrels of drinking water a short distance, to a few animals, much sooner than they could be driven to the watering place. As the piggery should always stand at a good distance from the dwelling-house, a swill barrel on wheels would always be found eminently convenient for carrying all kinds of swill, whether in a solid or liquid state, to the swine's trough. Such a barrel may be appropriated to numerous purposes which I will not mention. A lid is made to fit the top closely, and two hooks hold it down, so that but little of the contents of the barrel can escape even were it turned on the side. When water or swill is to be poured into other barrels or tubs, fix a temporary inclined plane with two planks for the block wheels and elevate the hands, so that the barrel may be turned top end down if desirable. Such a "go-cart" is often far more convenient for transporting sand a short distance, or some other material, than an ordinary wheelbarrow. A pair of wheels four feet in diameter are preferable to those only three feet in diameter, especially when the way is not a smooth surface.

Fig. 121.
Portable Water Barrel.

WHEAT—TO PREVENT FROM SPROUTING.—To give a remedy after the damage is done, may remind our readers of the old proverb, "after the steed is stolen, shut the stable door." But as a shrewd old friend sometimes remarks, "the best way is as good as any,"—a practice which will insure the grain crop from injury in wet season, and be wholly unobjectionable at other times, is worthy of adoption.

Fig. 122.

We have taken some pains to ascertain by experiment the precise time of cutting when the wheat crop affords the largest yield; and this we find to be when chaff has become about one-half or two-thirds yellow, green streaks running through it—a few days earlier is better than too late. We have recommended this practice to our readers, and also to our neighbors, and many have adopted it. A good farmer and careful observer informs us that he cut a part of his wheat this year while in this condition, and put it up in capped shocks,

well known to many farmers, and represented in the annexed figure. It remained during the long period of heavy rains which followed, dried thoroughly during this time, and came out as bright and as fresh as in any year; while all the rest, cut at the usual time, was badly sprouted. The contrast was remarkable.

We saw large fields the present year that were quite ripe enough to cut, before the rains commenced, and regretted, at the time the risk from delay that the owners were incurring, but did not dream of so disastrous a result.

Now if the practice of cutting early and shocking securely, is as good in any season, and better in wet ones, why not adopt it generally? Let our readers make a memorandum of this matter in their minds, for another year.

WHEAT SEED—Cleaning.—Washing the seed in brine as strong as it can be made, will prevent smut; it will also enable the farmer to skim out light wheat, chess, and almost anything else that may be in the seed, the strong brine bringing it to the surface much better than mere water. The wheat should, while in the brine, be stirred as long as any foul seed or light wheat rises; one bushel at once in a barrel is sufficient, with plenty of brine; then dip brine and wheat into a basket. When drained a few minutes, empty on a clean floor; take the same brine for another batch, and so on, until you have as much as you wish to sow that day; then sift on good slacked lime gradually, while another person follows around the heap and stirs it with a shovel; put on lime until the wheat will not stick together; then let it be sown and immediately covered; the lime will then continue to stick to the wheat, and be a good manure.

WHEAT—Smutty.—Smutty seed produces a smutty crop. The seed of the smut fungus, when examined by the most powerful microscopes, are found to be much smaller than the vessels or sap pores of the plant, and are doubtless carried through them. The experiment has been made by sowing good grains from a smutty crop, and which were no doubt well dusted with the fungus seeds. A portion was planted without any preparation, and the crop had many smutty heads in it. Another equal portion of seed was repeatedly washed in water, and the number of smutty heads was many times less. A third portion was washed in brine, with a still more favorable result. The best way is to wash first in water, then in brine, and then roll the seed in slacked or powdered lime. This process, if care is taken to prevent the seed from becoming tainted from foul bags or other sources, will nearly extirpate it.

WHEAT—Planting deep and shallow.—A successful farmer says that he has for many years examined many different fields; that in many instances he has found plants with a single stem, and in other instances

large stools throwing up several stalks. On examination he has found that the single stems always proceeded from deeply buried seed, and the large stools from seeds slightly covered. This shows the importance of graduating the depth of seed drills so as not to deposit the seed at much depth.

DRYING WOOD.—Every one who uses a wood stove has discovered that there is a great difference between the value of wood that is well or poorly dried. Most kinds of wood cut in winter, and left in large logs in the woods, become more or less soured and injured. If wood could be cut and split in summer, when the weather would dry it rapidly, the wood would be greatly increased in value, but as this is usually impracticable, the next best is to cut and split it in winter as fine as will be required, and then cord it up in a wood-house, well sheltered from rains, but admitting the free circulation of the air.

WOOD—QUALITY OF DIFFERENT KINDS OF.—The celebrated experiments of Marcus Bull, of Philadelphia, many years ago, gave the following results, showing the amount required to throw out a given quantity of heat:

Hickory,	4 cords.	White Oak,	4 3-4 cords.
Hard Maple,	6 2-3 cords.	Soft Maple,	7 1-5 cords.
Pitch Pine,	9 1-7 cords.	White Pine,	9 1-5 cords.
Anthracite Coal,	4 tons.		

WHAT YOUNG PEOPLE SHOULD KNOW.—*The best inheritance that parents can leave their children, is the ability to help and take care of themselves.* This is better than a hundred thousand dollars apiece. In any trouble or difficulty, they will have two excellent servants ready, in the shape of their two hands. Those who can do nothing, and have to be waited on, are helpless, and easily disheartened at the misfortunes of life. Those who are active and handy, meet troubles with a cheerful face, and soon surmount them. Let young people, therefore, learn to do as many different useful things as possible.

Every farmer's boy should know how, sooner or later,

1. To dress himself, black his own shoes, cut his brother's hair, wind a watch, sew on a button, make a bed, and keep all his clothes in perfect order, and neatly in place.

2. To harness a horse, grease a wagon and drive a team.

3. To carve, and wait on table.

4. To milk the cows, shear the sheep, and dress a veal or mutton.

5. To reckon money and keep accounts accurately, and according to good book-keeping rules.

6. To write a neat, appropriate, briefly expressed business letter, in a good hand, and fold and superscribe it properly; and write contracts.

7. To plow, sow grain and grass seed, drive a mowing machine, swing a scythe, build a neat stack, and pitch hay.

8. To put up a package, build a fire, whitewash a wall, mend broken tools, and regulate a clock.

There are many other things which would render boys more useful to themselves and others—these are merely a specimen. But the young man who can do all these things well, and who is ready at all times to assist others, and be useful to his mother and sisters, will command far more respect and esteem, than if he knew merely how to drive fast horses, smoke cigars, play cards, and talk nonsense to foolish young ladies at parties.

Every girl should know how,

1. To sew and knit.
2. To mend clothes neatly.
3. To make beds.
4. To dress her own hair.
5. To wash dishes and sweep carpets.
6. To trim lamps.
7. To make good bread, and perform all plain cooking.
8. To keep her room, closets and drawers, neatly in order.
9. To a work sewing machine.
10. To make good butter and cheese.
11. To make a dress, and children's clothes.
12. To keep accounts, and calculate interest.
13. To write, fold, and superscribe letters properly.
14. To nurse the sick efficiently, and not faint at the sight of blood.
15. To be ready to render efficient aid and comfort to those in trouble, in an unostentatious way.
16. To receive and entertain visitors when her mother is sick or absent.

A young lady who can do all these things well, and who is always ready to render aid to the afflicted, and to mitigate the perplexities of those about her, will bring more comfort to others and happiness to herself, and be more esteemed, than if she only knew how to dance, simper, sing, and play on the piano.

MECHANICAL

BAGS—MARKING.—This is easily done by applying black paint with a brush through holes cut as letters, through a piece of pasteboard. But the pasteboard, unless inconveniently thick, curls at the corners after a time, and the letters are defaced. Tin plate is much better, but it is difficult to cut the letters in it. Thick *sheet-lead* is, however, just the thing, and any person who can use a knife may cut the letters through it after they have been accurately marked.

BARNS—WASH FOR.—The *Horticulturist* gives the following as the best for this purpose. Hydraulic cement, one peck; freshly slacked lime, one peck; yellow ochre (in powder,) four pounds; burnt umber, four pounds; the whole to be "dissolved" in hot water, and applied with a brush.

BARNYARDS—PAVING.—Hiram Mills, of Lewis county, N. Y., thinks he has made a great improvement by paving his entire barnyard with cobble stones, adding greatly to the comfort of the stock, and facilitating the drawing of manure; and also enabling him to clean out all the manure, and keep a neat yard.

BARN DOORS—FASTENING OPEN.—Good barns are always supplied with fastenings to hold the doors while shut, but very few owners ever think of securing them while open, and as a consequence, strong winds often blow them about, slamming them against the walls or other obstructions, injuring or spliting them, and sometimes breaking them down from their hinges. Different modes are adopted for securing them while open. Doors which are merely fastened by a hook and staple at the place where the edge of the door strikes, to receive the hook and hold it fast. Another mode is to prop the door open by means of a stick provided for the purpose, an inch or more in diameter and three or four feet long (fig. 123,) which is fastened to the outer edge of the door by an eye and staple, the other end resting horizontally in a hook when not in use. This end has a sharp iron point, to prevent it from slipping on the ground or ice. When the door is opened the stick is placed in the position of a prop by a single movement of the hand; and when again

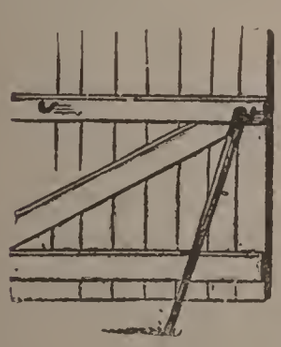


Fig. 123—Propping open Barn Door.

shut, it is lifted and laid in the hook. A third mode, which may be adopted where a common latch is used on the door, is to place a second catch at the outer edge of the door, which may receive and hold the latch while the door is open. This is better or easier to manage than either of the others, the latch being self-fastening in both positions.

BEETLE HANDLES.—A correspondent of the *Rural New-Yorker* says the best way to insert the handle of a maul or beetle, so that it will never come out nor turn, is first to bore an auger-hole through the head an inch and a half in diameter, and then cut the hole square with a chisel, making it an inch and three-fourths long on the lower side. Then make the handle to fit this enlarged part at the end, working the rest of it down to an inch and a half in diameter, and bringing the handle up through from below.

BEES' WAX—TO PREPARE.—To obtain wax, boil the combs in a strong muslin bag, in a sauce-pan, with water enough to keep it from burning; and whilst boiling, continue to press the bag with a wooden slice or spoon, to extract the whole, as you skim off the wax. Drop the wax into cold water, where it will swim on the surface. The wax thus obtained will still want refining, to effect which place it in a clean sauce-pan, and melt it over a slow fire. Then pour off the clean wax into proper vessels, and let it cool. To whiten it, make it in thin cakes, and expose it to the sun.

COAL—BIN FOR.—House cellars, which have smooth floors of hydraulic cement, as all such cellars should have, are often disfigured by the loose coal which is thrown in a heap upon them, and often scattered about loosely, in a general way. Neat housekeepers use large boxes or bins for the coal (fig. 124,) which is shoveled out with considerable inconvenience, at the top. A better way is to place the coal in a large box or bin, having an opening at the bottom, ten inches or a foot wide and several inches high, varying with the size of the coal, which at this place rests upon the floor. It is thus easily shoveled up into the scuttle, or into the hot-air furnace in the same apartment. As fast as the coal is thus removed a fresh supply falls down from above until the bin is exhausted.

Fig 124. Coal Bin.

BIRD HOUSES—CHEAP.—One of my neighbors uses tin cans which have been emptied of fruit, for houses for the birds. The smaller insectivorous birds can easily build in them. He fastens them by a band of tin, which is placed around the can, and nailed through the ends. Better do this than allow the cans to litter up the yards; besides it pays to protect the birds.

BLADDERS—TO PREPARE.—Let them soak twenty-four hours in water, to which a little chloride of lime or potash has been added, then remove the extraneous membranes, wash well in clean water, and let dry.

BOTTLES—To take loose corks from.—Bend a small wire in the form of the letter U, large enough to pass around the cork; then put the loop end of the wire into the bottle or jug, and turn it upside down, so that the cork will fall to the mouth of the jug, with the wire on each side of it and over the rear end, and it can be drawn out at once. The wire will be pressed into the sides of the cork as it is withdrawn. A small, strong cord will sometimes subserve the place of a wire.

When a bottle is full of any kind of fluid, so that the cork rises to the mouth, put in the wire and draw it up, and make it enter the hole straight, when it may be withdrawn.

BOARD FENCES—Facing.—A valid objection is made to the practice of nailing upright facing strips of board against the posts, after the horizontal boards are on—that they retain water, and cause the ends of the boards to rot before the rest. A better way is to omit the facing for many years, or until decay begins on the inner side of the boards next the posts, in consequence of the water retained on that side. After the boards have become loose, and have been repeatedly nailed on again, then is the time to apply the facing. Any strips of board about four feet long, and four or five inches wide, will answer. We have known fences that had stood about twenty years unfaced, and then begin to give out, made strong and firm for several years more by facing.

BRICK OVENS—How to build.—A brick oven made in the old style, out of doors, entirely separated from the dwelling house, is more desirable and safer, so far as danger from fire is concerned, than if built by the side of the fireplace in the house. A good brick oven for baking bread, pies and cakes is worth all the ranges and cook-stoves that one could store in his kitchen. In such an oven everything will be baked just right, above and below, through and through. After a foundation has been prepared, place two courses of hard bricks for the bottom of the oven. Then build the mouth and part of the sides until it is desirable to begin to draw the sides inward, when sand or loose earth can be placed on the foundation, and the surface smoothed off and pressed down to the desired form of the oven. Then let the brick work be built over this form of sand; lay two courses of hard bricks over the form, with the best mortar. After the last bricks have been laid the sand can be removed. The bricks should be soaked for several hours previous to being laid, so they will not absorb the moisture of the mortar until it has set. Such an oven will cost but a small sum. Many people can collect a sufficient number of loose bricks and pieces around their dwellings to build a brick oven, and any intelligent man, though only half a mechanic, can build such an oven about as well as a mason.

CART—Hand.—This is a very useful implement on every farm, and may be used for a thousand purposes. It holds a position between the common cart or wagon, and a wheelbarrow. It may be used in many places, such as gardens, door-yards, etc., for conveying manure or drawing off rubbish, or stones, where the larger vehicle would be inconvenient or do injury, and it is more easily drawn over soft surfaces, and will carry larger loads than the common wheelbarrow. In many cases its ready use will save harnessing to a wagon.

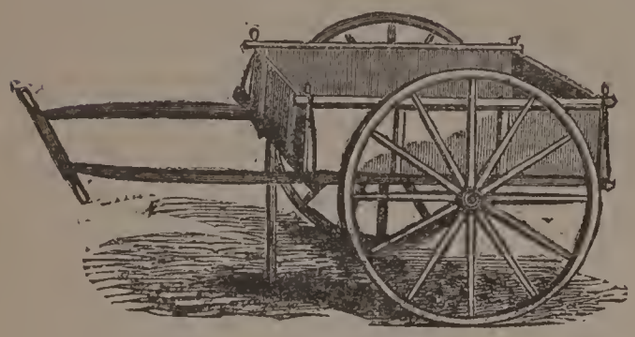


Fig. 125. Hand Cart.

CATTLE STABLES—Dimensions of.—Levi Bartlett gives the following measurements for the different parts of his cattle stables, fitted with stanchions, as the result of mature experience: The stables are 12 feet wide; the platform or floor on which the cattle stand, 5 feet long for oxen, 4½ feet for cows. The sills and top-joists for holding the stanchions, are each 2 by 6 inches. Two below and two above are placed side by side, and the stanchions in the space between them, every alternate one being loose at the top, so as to open and close again on the animal's neck. The manure gutter is 1 foot wide, immediately behind the platforms; the walk in the rear of this, 3½ feet wide. Distance between the slats of the stanchions, 8 to ten inches for oxen, 6 to 8 for cows. For smaller cattle, a strip of board is nailed on the fixed stanchion, so as to reduce the space. One inch by four is a proper size for the slats, if of oak; or 1½ inches thick, if pine.

CARRIAGES—Oiling.—The oil used for this purpose should have body enough to last some time, and for this reason castor-oil is one of the best. In applying it run the oil can lengthwise with the axle, on the top, and put a little in the oil chamber in the box. If the axle is always wiped clean before applying the fresh oil, it will remove grit and make it last longer. A person who has used lard a great deal for iron axles thinks that, although it runs off rather slowly in warm weather, it is not so lubricating as castor-oil.

CELLAR DRAINS.—To secure sufficient drainage, and to prevent the channels from becoming choked by sediment, much depends on the form of the bottom of the channel. We had recently occasion to take up and repair a cellar drain which had become obstructed, and had ceased to discharge water; and found the difficulty to result chiefly from a flat bottom, formed by placing horse-shoe tile in the usual manner on a plank bottom, as shown in fig. 126. The water which had passed into the drain, spread itself over the whole bottom; the current was shallow and weak, and was incapable of carrying off the small particles of solid matter which it con-

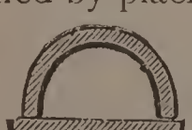


Fig. 126. Horse-shoe tile wrongly placed.

tained, and they were deposited, as a necessary consequence, in the bottom. Successive layers finally choked the whole channel. Channels for a similar purpose, either above or below ground, are frequently made of boards or plank alone, with a flat bottom, and with a similar result. Had the *corner* instead of the flat side, been placed downwards, the water would have been thrown together or concentrated, and instead of depositing sediment, would have swept it off freely, and left the channel clear. The accompanying figures show this result distinctly; the first (fig. 127) representing the water as spread over the flat bottom, and the second (fig. 128) the same amount of water collected together in the angle formed by placing the boards in a different position. In constructing a drain for similar purposes of *tile*, the curved portion should always be placed below. If horse-shoe tile is used, it should be inverted (fig. 129,) and covered with a stout sole, flat stone or plank. If tubular or pipe tile (fig. 130) is employed, no dfficulty will occur—although the results will be less striking than in an angle—and a small tile will be better than one too large.

Fig. 127.

Fig. 128.

Fig. 129. Inverted horse-shoe.

Fig. 130. Tubular tile.

These precautions are not required in common land drainage, as the water, before entering, becomes thoroughly filtered, provided the drains are deep enough. They should be entirely beyond the reach of frost, which by disturbing the soil, always produces some muddy water. In loose or porous soils, the depth should be greater than in those of a compact or clayey nature. In this latitude the depth should never be less than three feet for the former, nor less than two and a half for the latter.

CELLARS—VENTILATING.—Every one is aware, on a moment's reflection, of the importance of ventilating cellars—as foul air is not only detrimental to health, but is detrimental, or taints everything within its reach. During the warm part of the year, partial ventilation may be effected by opening opposite windows, but too much fresh air may render the cellar warm. One of the best contrivances, especially for winter, is to affix a branch pipe to the stove-pipe in the room above, for this purpose, as shown in the annexed figure. The pipe passing up to some height above the stove before joining, does not materially affect the draft; and all difficulty of this kind will be prevented by placing a valve at the floor, to be shut while the fire is kindled, or to be partly closed if too much air passes from the cellar, causing a cold draught from the exterior crevices. As foul air generally rises to the upper part of the cellar, it is drawn off in this way as fast as it accumulates, and the apartment kept pure.

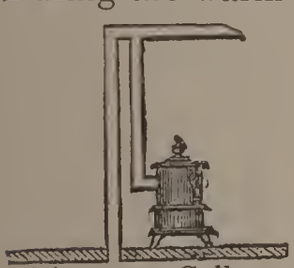


Fig. 131. Cellar.

CHAIN PUMP—To mend without taking it off.—When the chain breaks, uncover the well and hook up one end of the chain. Tie a long cord to this end, and the other end of the cord to a large cork. Drop the chain with its cork down the pump tube, when as soon as the cork passes the lower end, it will pop up to the surface of the water in the well. Draw it up and with the cord the chain, when the chain is readily united, and the circuit made again.

CHIMNEYS—Cement around.—A correspondent of an Agricultural paper makes the roof perfectly tight around his chimneys, by making tar and dry road dust (sifted) into a thick paste, and applying with a trowel, extending four inches over the shingles. This forms a perfect collar till the roof requires renewal.

CHIMNEYS ON FIRE—To extinguish.—"First shut the doors and windows of the room containing the fire; stop up the flue of the chimney with a piece of wet carpet or blanket; and then throw a little water or common salt on the fire. By this means the draught of the chimney will be checked, and the burning soot will soon be extinguished for want of air. Let this be remembered by the reader."

CHIMNEYS—To stop leakage around.—Remove the shingles and fit them again close to the sides of the chimney; then mingle a lot of coal-tar and sand together, making a stiff paste; spread it neatly around the chimney on the roof and press it down hard, and the water will be effectually excluded.

This plastic material will adhere to both the brick and the shingles; and neither frost, rains, nor dry weather will cause it to peel off.

CISTERNS—To make.—A very common and cheap form for the cistern is to dig a round hole into the ground with sloping sides, somewhat in the form of a pail, and then to plaster immediately on the earth, fig. 132. The reason for making the sides sloping is so the mortar will keep its place while soft, as it is impossible to find a soil dry and hard enough to retain the plastering by simple adhesion. In consequence of this the top of this kind of cistern must be wide, and therefore it is a difficult matter to cover very large ones effectually and substantially. Most commonly the covering is made of stiff and durable plank, supported if necessary by strong scantling, and over this is placed about twelve inches of earth to completely exclude the frost. A hole with a curb about eighteen to twenty inches, or even two feet, must be left in the covering for the admission of the water-pipe or pump, and to allow a man to enter, if necessary, to clean out the cistern. In cold or freezing weather, it is of the utmost necessity to have this hole well

Fig. 132. Cistern.

protected from frost, which would otherwise enter the wet cement or walls, and cracking and breakage be the result.

Another form for a cistern, and we think a superior one, being more capacious, and more durable, is to dig the hole with perpendicular sides in the form of a barrel, and build the walls with stone or brick to receive the plastering, fig. 133. In consequence of the circular form, operating like an arch, these walls will not be in danger of falling, if not more than half the ordinary thickness of similar walls. For large cisterns they should be thicker than for small ones. The walls should be built perpendicular until about half way up, when each successive layer should be contracted so as to bring them nearer together, in the form of an arch, reducing the size of the opening at the top, and rendering a smaller covering necessary. If the subsoil is always dry or never soaked or flooded with water, the walls may be laid in common lime mortar, and afterwards plastered on the inner surface with the cement. But in wet subsoils, the whole wall should be laid in water-lime. If the bottom is hard earth or compact gravel, a coating of an inch or two may be spread immediately upon the earth's bottom; but in other instances the bottom should be first laid with a flat stone, or paved with round ones, the cement spread upon these.

Fig. 133.

CISTERNS—Contents of.—The following gives the contents of circular cisterns, for each foot in depth:

	BARRELS.
5 feet diameter	4.66
6 feet diameter	6.71
7 feet diameter	9.13
8 feet diameter	11.93
9 feet diameter	15.10
10 feet diameter	18.65

CISTERN PUMPS FREEZING—To prevent.—Cistern pumps often are made to bring up the water through a curved or inclined lead pipe, so as to conduct it to any desired place in the kitchen. They usually have a valve to open by a stroke of the pump-handle, and let all the water down again, so as not to freeze. But careless hired girls frequently omit this, and the lead pipe is filled with ice, which often splits the lead and spoils the pump. A safer way, therefore, is to place a splinter of wood under the lower valve, to let the water leak out in about five minutes, and drain the pump. This is to remain only during winter. The best pumps are now made so as to *screw off* the base in a few seconds, laying the lower valve to view. If pump tubes become actually filled with ice, they may be quickly thawed by pouring hot water *directly* on the ice, through a small lead or

other tube, which must settle as fast as the ice thaws. Ice may be thus thawed a foot per minute—but without this tube it could not be thawed in a whole day, for the hot water being lightest, remains at the top.

CISTERN—FILTERING, CHEAP.—A correspondent furnishes in substance the following plan for a filtering cistern, recommended by its cheapness and simplicity, and which any mason can make without trouble, and at a cost of a dollar or two additional to any common cistern. The only drawback is a slight taste of brick for a few weeks at first. It consists simply of a brick partition, built across, through which the water percolates slowly, but quite as fast as it will be wanted for ordinary use. As there will be a great pressure of water against this wall it must be firmly set in the cistern walls with cement, and all built up together; and it must be convex with the pump, and toward the entrance spout—say a curve of six inches in five feet, or one foot in ten. Without this precaution the walls will burst by the pressure of the water when it pours in rapidly in a hard rain.

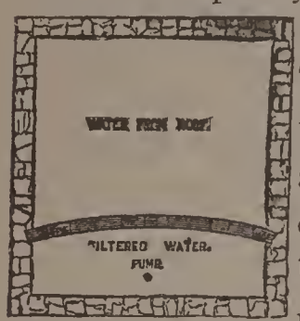


Fig. 134.—Filtering Cistern.

COAL—SHOVEL FOR.—A good shovel for filling coal scuttles or furnaces (fig. 135) is made by taking a common iron or steel scoop shovel to a blacksmith, who will bend up the sides at right angles to the bottom, of such a width as will be suitable for filling the scuttle or passing the furnace door.

Fig. 135.—Coal Shovel.

CLOCK—TO CLEAN A.—When the clock stops, don't take it to the repair shop till you have tried it as follows: Take off the pointers and the face; take off the pendulum and its wire. Remove the rachet from the *tick* wheel, and the clock will run down with great velocity. Let it go. The increased speed wears away the gum and dust from the pinions—the clock cleans itself. If you have any pure sperm oil, put the least bit on the axles. Put the machine together, and nine times in ten it will run just as well as if it had been taken to the shop. In fact this is the way that most shopmen clean clocks. If, instead of a pendulum, the clock has a watch escapement, this latter can be taken out in an instant without taking the works apart, and the result is the same. It takes about twenty minutes to so clean a brass clock and saves a dollar.

CLOCKS—LEVELING.—Clocks often run badly by not being set level—ticking unequally and stopping easily. They may be wedged up so as to be perfectly level, and an accurate ear will know by the ticking when this is effected. But a more perfect way is to tack a card or paper behind the pendulum in the evening, and place a bright lamp at a distance exactly in front. Then mark with a pencil the shadow of the rod, move it very slowly to one side until it ticks, and then make another mark. Move it to the other

side, and mark it when it ticks again. Measuring the distance of these three marks will enable the operator to level the clock to a hair's breadth.

CORK—Withdrawing a.—Not unfrequently corks are driven entirely within the bottle, from which they are sometimes withdrawn by throwing the loop of a cord or thread around them. This, however, requires a good deal of dexterity, as well as patience, and is not always successful. A much easier, and at the same time, a far better way, is to take a piece of annealed wire, which should be very thin—the smaller the better—make a loop just wide enough to hold the cork, and thrust this into the bottle, and over the cork, which is then easily drawn out. The spring of the wire will be sufficient to allow it to enter the mouth, and yet take in the cork.

Fig. 136

CORN-HOUSE—Plan of.—I give you a rough sketch of a corn house we built three years ago, and there has not been a rat or mouse in it yet. You will see it is not connected at the bottom—consequently use the gravel for a floor to drive in on—the only way a crib can be built rat and mouse proof. It stands on eight pillars, four on each side. They are eight inches in diameter, two feet ten inches long, sixteen inches of upper end is tinned—standing on stone blocks two feet square by six inches thick. On top of each post are saddles. It stands as firm as if it were on a wall. The ends are boarded up and down, with small rib slats over each crack. The sides are covered with slats two and a half inches wide, with three-quarter inch cracks. They are put on up and down from the projection to the under corner of the sill. Inside slats run the other way, horizontally. There is a door in the center of each crib, made of slats, to put corn in, to the depth of five feet. Then it is handed up from the wagon through the scuttle in the centre of the upper floor, which is laid with slats except one end nine feet square, which is a tile floor for a bin to hold shelled corn. The crib extends up to the roof, with three doors to empty the corn (three on each side.) Stairs hung with a hinge so as to swing up and fasten; when down the lower end rests on the walk. We cribbed, two years ago, eighteen hundred bushels of ears in this corn-house.

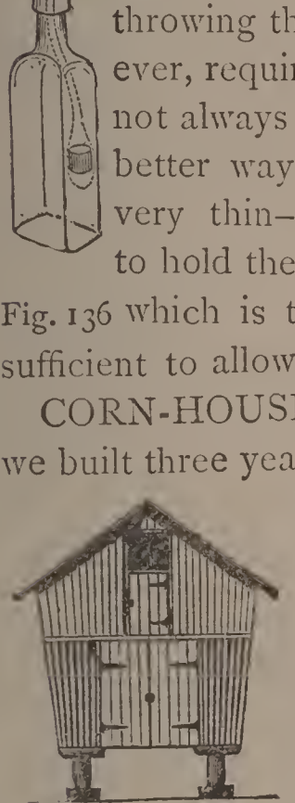


Fig. 137. Corn-House.

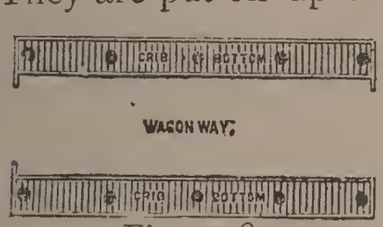


Fig. 138.

CRACKS OF DOORS—Muffling in winter.—Dress out some wooden rods, about half an inch or more square, and cover them with strips of woollen cloth. Strips of list wound around these sticks will subserve a good purpose; now close the door, not on the casing, as it is usually done, close in the corners, on the sides and at the bottom and top. A door can be made air-tight or wind-proof more perfectly by nailing the strips on the door than

to nail them on the casing, as it is usually done. When muffles are put on a door in this it way will shut easily but very close and tight. It would be a good improvement to fasten them on with small screws, as they could be more readily taken off in warm weather.

CRACKS IN STOVES are easily and effectually stopped by a paste made of ashes and salt with water. A harder and more durable cement for the same purpose is made by mixing iron filings, sal ammonia, and water.

PLANTS—CRYSTALLIZE FLOWERS, ETC.—Dissolve eighteen ounces of pure alum in a quart of distilled water by the aid of a boiling heat. When the solution is nearly cold, suspend in it, by a thread of silk or fine twine, the object to be crystallized for about twenty-four hours; they are then to be taken out and suspended in a dry, shady room till thoroughly dry. The proper temperature for the solution in which the object is to be immersed is about 95 degrees Fahrenheit. When the solution is too cold the crystals formed will be too large · and when too hot they will be too small. If different colors are desired, they may be given by boiling in the alum solution a little indigo, logwood, French berries, or a soluble vegetable or minerable dye whose chemical nature does not decompose, or is not decomposed by the alum. Among the subjects adapted to this purpose may be mentioned the moss-rose, ears of wheat, barley, oats, and other cereals, the grasses, and almost any variety of flowers; various insects, such as are interesting in the study of etymology; and above all the almost endless variety of sea weeds and mosses, which form one of the most beautiful features in the study of botany. For parlor ornaments, especially in the country, these preparations are vastly superior to and more attractive than the more costly works of art.

DIRT SCRAPER.—This implement is best and most durably made of cast iron—the handles being of wood. Although well known in many districts, it is worthy of a brief recommendation to all, and is a convenient labor-saving implement in leveling knolls, filling hollows, smoothing piles of earth around new buildings, forming embankments of hard earth for farm roads, scraping out broad open ditches for streams, etc.

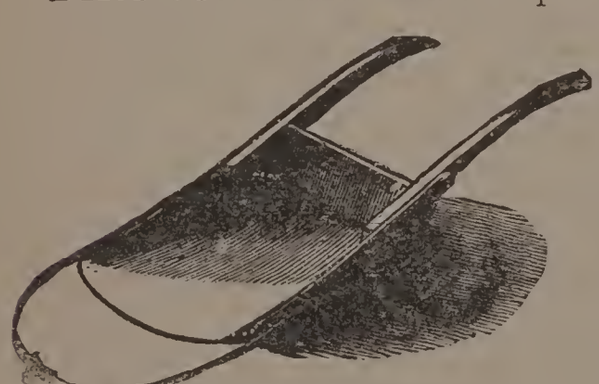


Fig. 139. Cast Irop Road Scraper.

DOOR—FASTENING.—Travelers who stop at third-rate hotels, often find their lodging-rooms destitute of bolts. The following simple fastening may be carried in their traveling-bags, and will secure them from intrusion during the night. Take a piece of large wire about four or five inches long,

bend it in a loop like the letter U, but narrower, then heating the points red-hot, bend them at right angles, and flatten the points like sharp wedges—the whole being similar to the form represented in fig. 140. In fastening the door, place the sharpened points of this loop against the door post or frame, and then by slamming the door slightly against it, the points will be driven in and hold it fast. It should be so placed that the loop may project about half an inch into the room; then take a short piece of iron and thrust it through the loop. The iron will extend across both door-frame and door, and prevent the latter from being opened, while it remains in the loop. There is usually space enough between any door and the door post for the wire loop. A small bar of strong wood will answer as well as iron, if the loop is large enough. In place of iron a piece of thick sheet iron, or still better, a thin plate of steel, may be bent as shown in fig 140, with a hole through the end for receiving the bolt, which may be a large nail, if nothing else is at hand.

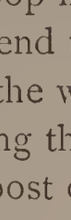


Fig. 140.

Door latches will work easily and with little noise, by touching them lightly once a week with a little oil or tallow.

DOOR LATCHES.—Nothing wears out the door of a house faster than slamming or rattling against latches that do not catch. They should be at once repaired, and latches and bolts which do not slide easily may be made to do so if touched with a drop of oil. It is well to pass around once a week with an oiled feather, and touch every latch and bolt in the house.

DOORS—Sagging.—When a new house is built, the doors commonly work well for a time, but as time elapses one of them begins to strike the sill at the outer corner; another "gets stuck" against the lintel; a third strikes the side piece, and a fourth cannot be shut at all. The various slammings, pullings, jerkings, and vain or difficult efforts to open or shut the door, twist, crack or injure it, deranging the knob or lock, and rattling down the adjacent plastering. The carpenter is called in, and by sawing or planing off the painted edge, succeeds in effecting a remedy for the present time. In nearly all such instances, either the building has settled out of shape, or the hinges have become worn or loosened. When the latter is the case, sometimes a slight replacement or even screwing up of the hinge will answer the purpose. If the iron on which the hinge hangs has been worn small, a remedy may be applied in the form of a small washer, which may be a tube of tin or thin sheet-iron slipped over it. If the building has settled (and a very slight settling will derange all the doors,) the use of a jack-screw with thin hard-wood wedges may be made to remove all the difficulty.

When a door sticks against the base or lintel, the difficulty of opening and shutting may be removed temporarily, by pressing firmly on the door knob in the direction *from the adhering part*. For instance, if the door

sticks at the top, press downwards—if at the bottom, lift upwards—and it may be readily opened or as readily shut.

DRAINS—Board.—The following mode of constructing board drains instead of tile, when the latter cannot be had, is given: It will be observed that a great advantage is derived from laying the tube *corner down*, as there is a stronger current of water carrying off sediment which would gradually settle in a flat bottom drain, and ultimately choke it.

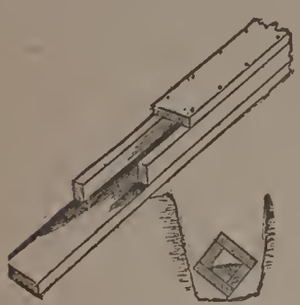


Fig. 141.
Board Drains.

DRAIN—For a rod of two-inch.—Two boards 4 inches by 1 inch, 16½ feet long, nailed together with just nails enough to keep the board in place. Now by placing the ends of the boards three inches from each other, a very nice joint is made. In laying the drains, they can either be laid flat, or, what is better, on one of the corners, forming a diamond shaped drain. If there are not too many nails put in the boards, there will be plenty of room for the water to find its way into the drain.

FENCE—Rail, to build.—Begin at the bottom of all hills or ascents, and build up—this will make the fence stand much better against the winds and all disturbing causes.

FIRE—How to act in case of.—Better than all elaborate and costly apparatus for extinguishing fires are constant care and watchfulness, and quick and intelligent action on the part of those who first discover a fire in progress. The fire, which at its first beginning, could be smothered with a pocket-handkerchief, or dashed out with a bucket of water, neglected a few hours lays in waste millions of dollars' worth of property. If there is any time in which a person should be cool and calm, in perfect command of himself, it is when he discovers a fire that threatens the destruction of life and property. The first thing to do is to learn precisely where it is; the second to consider the chances of extinguishing it. Of course, in cities an alarm should be at once sent out, but at the same time a vigorous effort should be made to put out the fire with the means at hand; for sometimes what the fire engine is unable to accomplish when it reaches the scene can be done by one or two persons who act promptly before the flames have had time to gain headway.

First, then, do not be alarmed on account of smoke. Frequently there is a great deal of smoke before the fire has made much progress. Remember that one can pass through smoke by keeping his head near the floor or by enveloping it in a wet woolen cloth. On entering a room to fight down, a fire single-handed, keep the door closed behind, if possible. A pail of water and a tin dipper in the hands of a resolute person can be made to work a miracle at the beginning. If the fire has progressed too far to

admit of this course, and it is necessary to depend entirely on outside help, then see to it that every door and window is closed. By so doing, where there is a fire-engine in the neighborhood, it will often be possible to confine the fire to one room. Every person who stops at a hotel should take special pains before retiring to note the location of the stairways, so that in case of an alarm he can find his way out even though the halls are filled with smoke. Never leave a room where there is an alarm of fire without first securing a wet towel, or, if possible, a wet sponge or piece of woolen cloth through which to breathe. If escape by the stairs is cut off, seek an outside window and stay there till help comes. Above all things be cool and have your wits about you. When a lady's dress takes fire let her fall on the floor at once and call for help, in the meantime reaching for some rug or woolen cloth with which to smother the flames. There is nothing new in this advice. It has been repeated in one form or another hundreds of times; but it will bear repeating thousands of times.

FOOT MUFF—How to make.—Those who take long rides in winter, are often obliged to resort to artificial means to keep their feet warm: hence hot bricks, heated blocks of wood, and jugs filled with hot water are variously used. The foot muff is a great improvement on all these. It may be made in different ways, one of the cheapest and most simple of which is as follows: Let the tinner make a square box, about one foot square, and two inches thick, so as to hold water. A screw, turned by a button, is inserted into one of the narrow sides—the screw hole should be large enough to admit a funnel. The box should be perfectly water-tight, the screw hole being the only place for the admission and egress of the water. If a suitable screw cannot be procured, solder in a short tin tube, about an inch long, to receive a cork, which is to be tightly pressed in. This box, when filled with hot water, which may be done in a few seconds, will retain heat a long time; but its efficiency may be greatly increased by encasing it with the muff. The box itself may be first covered with a piece of coarse carpeting, and then a sheep skin, tanned with the wool on, sewed on the upper large flat side of the box, somewhat in the form or a broad shoe, with the wool inwards, and large enough to receive both feet. This essentially completes the foot-muff. The more expensive ones are covered with fur instead of sheep skin; and if the skins extend around the whole box, the heat of the water will be retained a longer time. A well made muff of this kind, filled with hot water and placed in the bottom of a sleigh, will continue warm for half a day.

GATE—Small farm.—A writer gives the following description of a simple farm gate. It has no hinges, but operates like a set of bars, with the exception that the bars are all fastened together as in one piece, made

Fig. 142.

light enough to handle readily and to be removed at a single operation. Such a gate never gets open by swinging, nor out of order by sagging. Each end of the fence at the opening is finished as in fig. 142, the extra post being placed at one side of the other at a distance of a little more than the thickness of the boards—each end being on opposite sides of the post. The short cross-pieces hold up the ends of the gate. The gate is first placed where it is wanted and these cross-pieces are then nailed under the projecting ends of the boards. To open the gate, push it back a little and swing it around as far as at right angles, if desired, or remove it altogether.

GATE—Self-shutting.—There are many plans resorted to for causing gates to shut of their own accord. For small or light gates, we believe that the spring represented in the accompanying engraving has no equal, fig. 144. The different parts of the spring are shown in 145, where *a* represents a spring which is screwed on to the gate in a horizontal position, as is shown in fig. 144, having a small wheel at the outer end, in which the bent lever, *b*, moves in opening and shutting. In the outer end of this lever a small chain is hooked, connecting with the gate. When opened the spring is bent, as shown by the dotted line. In constructing this contrivance, the great point is to form the curve in the lever in such a manner that there shall be a continued and uniform pressure upon the spring at whatever distance the gate is opened. The form represented will nearly accomplish this purpose. its length being about equal to the distance between the post and small wheel on the end of the spring. This contrivance was patented many years ago and retailed at $1.50, the lever being simply made of steel rod. The patent has probably expired.

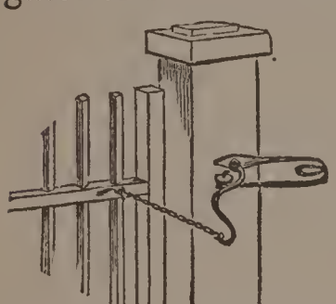


Fig. 144. Spring for Shutting Gate.

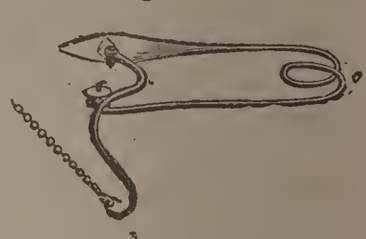


Fig. 145. Same Enlarged.

GLASS—How to cut.—Let a pane or piece of glass be held between two pieces of soft-wood board, planed smoothly and true, and hold it in a vise firmly; if the edges of the two boards are even with each other the glass may be broken off very true. The boards will prevent its cracking beyond their edges. Glass may sometimes be cut with a sharp corner of an old file almost as well as it can be cut with a diamond.

GLASS—Hand.—A cheap hand-glass is made by taking strips of board three inches wide, run the match plane, that makes the groove, near one edge, saw to such lengths as when nailed together in the form of a parallelogram, it will just admit a pane of glass to slide in the grooves. One end

should be lowered to admit the glass to slide over it. When not in use the glass can be taken out and put away. By their use the plants may be easily ventilated by sliding the glass, more or less, according to the temperature. The glass should be at least 8 by 10 inches; larger would be better.

WHEEL GREASE.—Two parts hog's lard by bulk, and one each of black-lead and wheat flour. We have heard wagons a mile off, on a still morning, uttering the most dismal sounds, from the want of a little of this material, and which a very little imagination translated into words—"meeze-e-ry, meeze-e-ry, meeze-e-ry!"

GRAIN SCOOP.—A correspondent of the *Genesee Farmer* has successfully used a grain scoop for filling bags, made as shown in fig. 146. One hand grasps the bow handle and the other the handle at the end. A half bushel is easily scooped up at one operation and the bags filled in one-half the time required in using the common scoop shovel.

Fig. 146. Grain Scoop.

GRINDSTONES—TARRING.—A correspondent makes the following good suggestions: When you have a grindstone in perfectly straight face across the stone, take a little good tar and make a ring around the stone in the center, and it will cause it to ridge up in the middle, so as to be more convenient for grinding a perfect edge on a tool. You need not tell your careless neighbor to please grind on the edge of the stone, for he cannot grind in the center—the tar will prevent him from gouging out the middle, and leaving the face irregular.

HARNESS—OILING.—Well kept harness will last many years; neglected, allowed to be dirty, dry and unoiled, it often wears out in two years. It should be washed once a month with castile soap, using a good sponge, and oiled at least twice a year. Take the harness apart, soak it in water only blood warm for a longer or shorter period, according to its dryness and stiffness from one to three hours. Wash with castile soap, work till soft and pliant, and hang up to dry moderately. When half dry, oil the pieces, and let them dry a day longer; then rub with a coarse cloth.

NEAT'S FOOT OIL.—The following mode of making the best neat's foot oil is given by a correspondent:

Take the feet of a beef, crush the bones well with a sledge or ax, and boil them in a large pot of water for twelve hours. Make two quarts of tallow from fresh beef or mutton suet, and pour it into a four-quart can (which should have a lid to keep out mice), and place it on a stove. Add a lump of pure yellow wax as large as a hen's egg, stirring as it melts. Then fill up the can with neat's foot oil, and removing it from the fire, continue to stir until the intermixture is thoroughly complete. This, when cold,

will be of about the same consistency as hog's lard. Keep in the can a bit of sponge always ready for use. It ought to be damp when it first goes into the grease, as it will remain more flexible always afterwards than if greased when dry.

HARNESS AND BOOTS — PRESERVING.—A correspondent of the *Country Gentleman*, thinks the following preservative will make boots last twice as long as without it, keep dry feet and preserve health: Take two pounds beef tallow, half pound of rosin, quarter of a pound of besswax, and four ounces of castor oil. Melt slowly, adding and mixing well a heaped tablespoon of lampblack. Do not let it boil. When thoroughly melted and mixed, it is set aside for future use; when wanted for use, put a small quantity in a tin basin and melt it, do not let it boil. Apply to the leather quite warm, with a stout piece of cotton cloth, folded tightly and sewed strongly together, so as to be about two and a half inches long. Hold this in the fingers, and rub the composition well into the leather, holding the latter frequently over a hot stove. Apply both to soles and upper leather. In applying to harness, add about as much neat's foot oil, to be applied warm near a stove.

KNITTING HEELS.—To knit the heels of socks double, so that they may thus last twice as long as otherwise, skip every alternate stitch on the wrong side, and knit all on the right. This will make it double, like that of a double-ply ingrain carpet.

HORSE-HITCHER—MOVABLE.—Whoever drives a horse and buggy has been annoyed frequently for want of a hitching post. The figure shows the mode for making one, which may be carried under the seat, and used whenever wanted, by screwing into the ground. It may be done in the open field, by the roadside, or on the picnic or crowded fair ground. The hitcher is best made of steel, the largest size steel rod used for spring-tooth horse rakes answering a good purpose. Iron rod will do, but it must be larger (half an inch or five-eights in diameter,) and it will not enter the earth so easily. Any blacksmith may easily make one. The coil should be about three inches in diameter, but if the soil is soft and light, four inches may be necessary, although it is better to have it longer so as to penetrate further into the earth. The ring must be large enough to give the screw a good purchase in inserting it. These hitchers, made of steel, might be made by the hundred for twenty-five cents each.

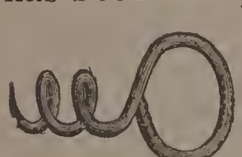


Fig. 149. Movable Horse Hitcher.

This contrivance also answers an excellent purpose for tethering a horse or other animal, while nibbling grass in a back yard, fence corner or border of a cultivated field.

HOUSES—LEAKING.—There are very few common houses built of

wood that will not, after a long season of drought, leak badly at some places, when heavy rains occur. The best cement for stopping all cracks or openings where the rains enter, is a mixture of sand and white lead paint.

ICE-HOUSES.—These, when constructed of wood and boards, are severely tested in their durability by the moisture flowing from the melting ice. Nothing can, therefore, be more effectual in preventing decay than to coat all the timbers and boards with gas tar, when they are dry or well seasoned. This treatment will prolong their durability many times.

ICE-HOUSES—Filling.—A good deal of labor is sometimes lost by not adopting the easiest mode of lifting the ice out of the water. After the blocks are sawed in the water (which should be done by accurate measurement, so that all may pile up solid, like hewn stone, and leave no crevices,) they are very easily and quickly drawn out by means of a light, stiff plank, having a cleat across one end. This plank is thrust with its cleat into the water, and under the block of ice; the cleat holds it, when the plank is drawn forward, and thus lifts it out.

Fig. 150.—Drawing ice out of water for ice-house.

KNIFE-BOARD—Improved.—The board B is three feet long by one and a half wide. A is a scouring brick made from fine clay—an excellent article for the purpose can be had at all grocers. C is a piece of buff leather nailed or firmly attached to the board as shown. It is well to nail a half-inch strip on the edge of the board, to prevent the sand, etc., from falling off. This board occupies but little space, is cheaply and quickly made, and will be found to answer the purpose admirably. A high polish can be given to the knives by a few strokes over the leather.

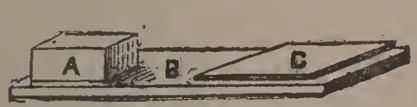


Fig. 151.—Knife-board.

LADDERS—Sharp feet for.—Ladders are nearly always made with blunt, rounded or square ends; and as a consequence, when placed upon a smooth surface, especially if frozen or icy, there is danger of their slipping or falling. The lower ends should always be sharp or wedge-form (fig. 152.) If much used, they should be shod with iron—the simplest mode of doing which, is to take an iron strap, bend it by heating in a fire or forge, to a sharp angle in the middle, so as to fit the wedge form of the feet, and then nail it on through holes punched for the purpose.

Fig. 152. Sharp Feet for Ladder.

LAMP LIGHTERS.—These may be easily made by tearing waste paper into strips an inch wide, and rolling these strips neatly by beginning

at the upper corner and rolling nearly but not quite parallel with the side of the strip. When completed, bend up and pinch the lower end to prevent unrolling. A little practice will give them a very neat appearance. If desired, they may be made long enough to run down the chimney of a kereosene lamp.

LEATHER GLOVES—To remove spots from.—Suspend them in a glass jar, closed, over a portion of the strongest liquid ammonia. The gaseous ammonia gradually removes the spots; but great care is to be taken that the liquid does not touch the gloves, or the color will be badly injured.

LIGHTNING RODS.—The best is a single rod, with the point extending upwards near the centre of the building, and the rod passing down by the shortest way. Itinerant rod erectors, who charge by the foot, find it to their interest to bristle the roofs of houses and barns with many points, which are connected together by various horizontal pieces of iron, and then with the earth by one or more perpendicular rods. Each chimney is regarded as positively requiring its point, as shown in fig. 153, and sometimes several more are added. If these are all perfectly firm and secure, so as never to become displaced, and are well connected with the horizontal portion on the roof, and with the downward one to the earth, they may answer the purpose. But we should much prefer a single rod in the centre, fig. 154, supported by a small wood standard (set in the ridge timbers,) and extending to the earth by bending down along the roof and side wall, in the rear. The expense would also be greatly diminished, inasmuch as one point and one rod are cheaper than several. All that it is necessary to observe is, the point of the rod should be one-half as high above the tops of the chimneys, as the horizontal distance to them from the rod. The same rule will apply to barns. Fig. 155 shows the way in which three points (and sometimes more) are commonly put up on such buildings. A much better mode is exhibited by fig. 156—taking care to secure the requisite height. If a rod always enters water, the water forms a good conductor to dissipate the fluid—but if the water is drawn off below the lower end of the rod, the latter may become a dangerous appendage, by drawing down the lightning without furnishing it a ready means of escape. On the whole, permanently moist earth, which may usually be found at a depth of six or eight feet, may be best.

Fig. 153. Fig. 154.

Fig. 155. Fig. 156.

LOGS AND PLANKS—To prevent the splitting of.—Logs and planks split at the ends because the exposed surface dries faster than the

inside. Saturate muriatic acid with lime, and apply like whitewash to the ends. The chloride of calcium formed attracts moisture from the air and prevents the splitting. Tobacconists' signs, and other wooden images, have usually a hole bored through their centre, from top to bottom; this in a great measure prevents the outer surface from cracking, by allowing the wood to dry and shrink more uniformly.

LOGS—SPLITTING.—But few understand the system of splitting logs, and the consequence is about one-half the timber is spoiled, besides much valuable time wasted. Even with these disadvantages, after the rails are split, some are found too large, others too small, while others will be twice as large at one end as at the other. In fig. 157 we show the sawed end of a log ready to split. So far it looks easy, but by taking a piece of red chalk, or a carpenter's black marking pencil, and with the aid of a straight edge draw the two marks or diameters across it at right angles, as shown by the larger lines, the work is begun on a system. After doing this, then where the dotted lines are seen, draw two other lines. As will be easily seen this will cut the log into eight pieces, and each piece of the same size with the other. After this it should again be subdivided according to its size. If the log is a large one it can be divided up in more pieces than a small one—if, say, twenty-four inches, or a little more in diameter, it may be laid out for fifty-six rails, as shown in fig. 158; varying with the intended use of the rails. If for a common worm fence, the rails are about the same measure in breadth and thickness; but if for post and rail fence, they should be flat and broad. Either of these forms may be easily made by increasing or diminishing the number of the cross-connections between the radiating lines.

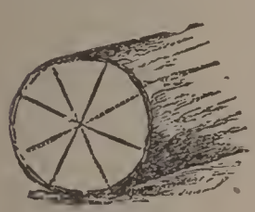


Fig. 157.

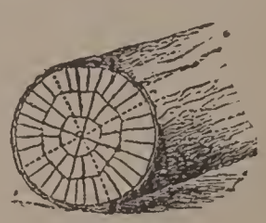


Fig. 158.

Fig. 159 shows a smaller log, one about eighteen inches in diameter, marked for splitting into twenty-four rails, and fig. 160 another log somewhat larger and straighter, and with fewer knots, marked for splitting in thirty-two flat rails and eight common ones. These instructions are so simple that any one of ordinary intelligence can understand and practice them, and can easily mark out any log, no matter what the size may be, by a little thought. After doing this the splitter will proceed rapidly with his work, without any hesitation, or without being compelled to stop and think where he shall next set his wedge. By this means he will not only save time and timber, and turn out better and more uniform rails, but will also save much trouble.

Fig. 159.

Fig. 160.

Any one who has had experience in splitting wood of any kind, knows full well that in order to prevent the cleft from running off on one side or the other, it should be nearly in the middle of the stick, hence the general and invariable rule to keep reducing the size of the sections, not as many would suppose, by taking a rail from the side, but by striking through the middle. The log should, therefore, be first split in two, and these halves again split into four quarters, one of which is shown in fig. 161. This again to be split into two parts, fig. 162, and those again split as before in two parts. In this way there will be but little tendency to form uneven rails; and if the cleft is controlled somewhat by striking the wedge or axe a little ahead, no trouble need be feared.

Fig. 161.

Fig. 162.

MATERIAL FOR REPAIRS.—Every farmer, and especially those who are some distance from mechanics shops, should be well provided with all the usual materials for repairing tools, implements, etc., as the delay in their use is often many times greater than the cost of putting them in order. Provide boxes with apartments, and purchase at hardware stores a supply of screws and nails of different sizes, screw-bolts with nuts, and nuts alone, rivets, coarse and fine annealed iron wire, copper wire and pieces of copper straps, common and tarred cord, twine, scraps of leather, paint with paint brushes, varnish and all the necessary tools. The great flexibility of copper wire and copper straps renders them very useful on many occasions.

Fig. 163. Measuring Corn in Crib.

MEASURING—Corn in the crib.—Multiply the length, breadth and height together, in feet, to obtain the cubic feet; multiply this product by four, and strike off the right figure, and the result will be shelled bushels, nearly.

MEASURING—Hay, wt. to be estimated.—Hay is usually sold by the ton, but on account of its bulk is often inconvenient to weigh. In general the following relations of weight to bulk are reliable:

	Cubic yards to the ton
New mown hay	25
Loaded and stored	20
Well settled	15
Baled	10

It remains to estimate the number of cubic yards. If the stack or mow be square or rectangular, multiply together the length, breadth, and half the height in yards. If the stack be long and triangular, multiply together the length and half the height in yards. If the stack be circular, multiply together the square of the circumference by .04 of the height in yards. To calculate the price of a given number of pounds of hay, multiply the number of pounds by one-half the number of dollars per ton, and point off three places. Thus, at $30 per ton, 400 pounds are worth, 480x15=7.20.

Fig. 165.

MEASURING—Acres in a field.—To estimate the number of acres in a certain field, remember that an acre equals 160 rods, or 4,840 yards, or 43,560 feet. Hence measure the length and breadth of the field in rods, divide by 16, and point off one place; or measure it in yards or paces, multiply length by breadth, and divide successively by 11, 11 and 4.

LIVE CATTLE—To estimate weight.—The superficial feet of animals are estimated by multiplying the feet of girth just behind the shoulder-blade by the feet of length of back from tail to fore part of the shoulder-blade. Thus an ox whose girth is eight feet six inches, and length six feet, would measure $8\frac{1}{2}$x6=56 superficial feet. This assumes the shape of the body to be cylindrical, and is, of course, only an approximation. For ordinary estimates, the following may be regarded as the rate per superficial foot:

Fig. 164. Measuring Live Cattle.

	Pounds.
Girth less than 3 feet	11
" from 3 to 5 "	16
" from 5 to 7 "	23
" from 7 to 9 "	31

Thus, an ox of the size alluded to would weigh about, 51x31=1,581 lbs.

MEASURING—Height of trees.—It is often desirable to determine the height of a tree, if not with mathematical correctness, at least with something approaching accuracy. There are instruments made for the

purpose of measuring with great precision, but there are several methods by which the height can be ascertained without expensive appliances. By measuring the shadow of a rod or other object of a known length and the shadow of a tree, a simple sum will give the height. Suppose we measure the shadow of a perpendicular rod six feet long, or that of a man of the same height, and find it to measure eight feet, and then measure the shadow of the tree and find it to be one hundred and thirty-two feet; then

as 8 ft. : 6 ft. : : 132 ft. : 99 ft.

The *Gardeners' Chronicle* figures a simple quadrant for tree-measuring which we here explain. A quarter of a circle is made of some light wood, and a small plumb-bob is suspended from what would be the center of the circle, and a mark made just half-way of the curved side of the quadrant. Two small eyes for sights attached to one of the straight edges make the implement complete. The quadrant is held by the operator, moving backward or forward until he can see the top of the tree through both sights, the plumb-line at the same time hanging over the mark. The distance of the observer from the tree, when he can see the top of it in this manner, will be the height of the tree. Allowance must be made for the height of the eye from the ground, and for any difference in the level of the ground between the tree and the observer.

ANOTHER METHOD.—In his tale of *Monsieur Violet* Captain Marryat gives, as an instance of great aptitude for applying simple rules possessed by the Shoshonee Indians, that when they desired to measure the height of a tree at any time when its shadow was cast on the ground, they would drive a stick a given length into the ground, and then, calculating the difference between the length of its shadow and its actual height, and applying the same to the shadow of the tree, they ascertained its correct height, thus unknowingly working out a sum in the rule of three. Any person, however ill-informed, might easily get at the exact height of a tree when the sun shines, or during bright moonlight, by marking two lines on the ground three feet apart, and then placing in the ground on the line nearest to the sun a stick that would stand exactly three feet out of the soil. When the end of the shadow of the stick exactly touches the farther line, then also the shadow of the tree will be exactly in length the same measurement as its height. Of course in such a case the sun will be at an exact angle of forty-five degrees. Measurements of this character could be best effected in the summer when the sun is powerful, has reached to a good height in the heavens, and when the trees are clothed with living green, so as to cast a dense shadow. To many to whom this idea might not have occurred, it might be made annually a matter of interest thus on warm summer days to take the height of prominent trees, and so to compare notes of growth from year to year.

MEASURING IMPLEMENT.—Make the implement as shown in the cut, but lighter, with the points four feet and one and a half inches apart. It may be used for measuring rapidly, by walking it along a ditch or furrow. It is much more accurate than the common mode of pacing, and about as fast after a little practice. Four measures will make a rod, or if the points are made five and a half feet apart, three will make a rod.

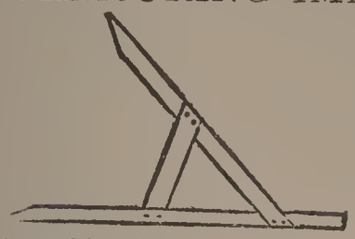


Fig. 166.—Measuring Implement.

MEASURER—LAND.—Every farmer should understand how to measure his lands, to know the number of acres he owns, and the amount in different fields. With the instruments we give below any one can measure his own farm without resorting to the aid of a surveyor. One of the most rapid and convenient modes is the use of a light angular wheel, which is thrust forward as fast as the measurer walks. Fig. 167 represents a wheel for this purpose, made of strips of wood a little larger than common lath—lightness being very important, in order to prevent the successive jerking which would take place if the implement were heavy, as each point strikes the earth. The wheel is of such a size as to revolve once at every rod in length. To effect this purpose the strips must be $32\frac{1}{4}$ inches long from the centre (as calculated by trigonometry,) which will give $24\frac{3}{4}$ inches from point to point. To construct this wheel, take a round piece of board about an inch thick, and saw radiating spaces into it, shaving the wood between the saw cuts out with a sharp chisel, fig. 168, then lay in the strips and screw them in. Then screw on another round piece of board and the hub will be complete. The radiating strips or spokes should be fitted with accuracy, so as to be firm, and the points at equal distances. Then measure from point to point, and if all are accurately $24\frac{3}{4}$ inches apart, the measurements of the land will also be correct, 8 times $24\frac{3}{4}$ inches being $16\frac{1}{2}$ feet. It is best to drive a nail lengthwise into the end of each arm or spoke, before whittling it down sharp, as this will prevent the point from wearing down and becoming ultimately too short. A straight, smooth piece of rod iron, with a crew and nut on one end, is then inserted for an axle; and two strips of board placed on each side to receive the ends of the axle. A washer made of sole leather may be placed on each side of the wheel and inside the strips of board. These two strips have blocks placed between them to keep them at suitable distances apart, and a cross-bar is passed through the rear end for a handle. For measuring farms of moderate size this will be sufficient, with the addi-

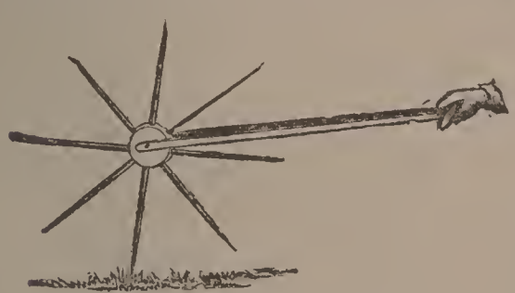


Fig. 167—Land Measurer.

Fig. 168.

tion of a strip of red cloth on one of the spokes, so that each revolution may be easily seen by the operator as he pushes the machine before him. For more extensive work two wheels, for recording, are to be attached, as shown in fig. 169. These may be about six inches in diameter and made of inch board. They are placed in the space in which the wheel revolves, which must be made wide enough for this purpose. The first has twenty small, headless nails driven into its circumference at equal distances, projecting half an inch or more. A short tooth projects from the axle (easily inserted by drilling a hole,) and so situated that at every revolution it comes against one of the nails, thus pushing the wheel on a short distance. At the next revolution it pushes another nail on. In this way the wheel revolves once for every twenty rods. On the axle of this wheel is a similar single tooth, which comes successively against one of the sixteen nails of a second wheel, made like the first. Thus the second wheel revolves once in a mile, or 320 rods, and long distances may be easily counted without much trouble to the observer. It may be used to measure roads, either on foot or by being drawn behind a wagon. The wheels should have enough friction at the axles to prevent any possibility of their slipping, which is easily effected by a spring pressing the axles, or by boring a hole down close beside the bearing, and thrusting in a wooden plug or wedge, so as to press moderately against the axles.

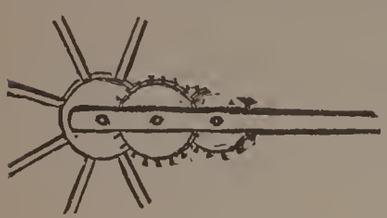


Fig. 169.

This machine may be made of pine, which is light and sufficiently stiff, but the arms or spokes should be of oak or other hard wood. If they are half an inch thick and two inches wide at the hub, tapering to an inch or less at the outer end, we have found them to be quite stiff enough. Any ingenious farmer who has a workshop will readily make one for himself.

The measurements will, of course, be most correct on smooth, hard ground. On a freshly plowed field they will be attended with considerable inaccuracy, and should be made after the field is harrowed and settled. It is always advisable to prove the work on a piece of measured ground, to see if the spokes are of the right length. With iron points to the arms, measurements may be rapidly made on hard crusted snow.

For shorter distances, as gardens, village lots, etc., very accurate measuring may be effected by a light eleven-foot pole, three lengths of which make 33 feet or two rods. A blacksmith will make a good handle of round iron, as shown in fig. 170, a screw being cut on the lower end for insertion into the rod. Thin bladed knives, or slits of tin, may be thrust into the ground against the ends, by which one person will do the measuring alone—the handle being placed near one end for this purpose.

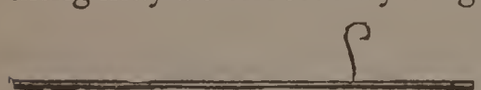


Fig. 170.

MEASURING—Timber in the tree.—A simple method, and one that can be put in practice at any time and place, when one has only a measuring rod, and has the experience of the writer, as follows: A stick of timber is desired, say fifty feet long. Select your tree, measure fifty feet in a direct line from the foot of the tree on as near level ground as possible; now cut a stick the exact height of the observer, and stick in the ground exactly perpendicular; now let the observer lie flat on his back, his feet against the stick and head in line of tree and stick, and look directly over the top of the stick, and where the line of vision strikes the tree will be the length of stick (fifty feet) desired. If the ground is not level, the measure will not be exact, but allowance must be made.

MEASUREMENT—Self, rules for.—The following rules will enable persons in the country to avail themselves of the services of clothiers in the city without the necessity of a personal visit. To insure an accurate fit, all measures should be taken with care, and height and weight correctly given

Coat—Height——Inches. Weight——Lbs. Take these measures outside the coat:

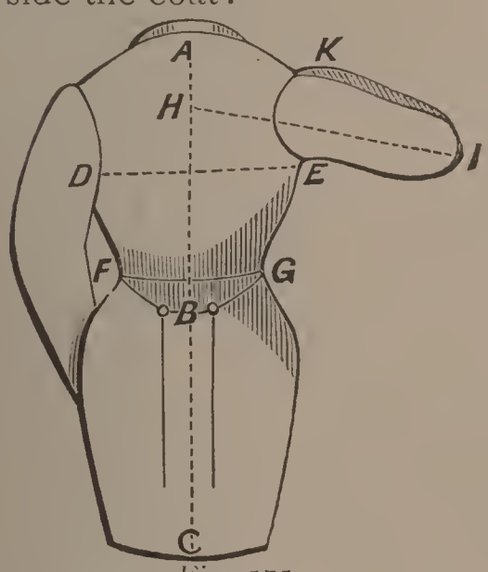


Fig. 171.

From *A* to *B*——inches, and on to *C*——inches. From *H* to *I* for elbow point —— inches, and on to *K* for length of sleeve——inches.

Take these measures under the coat:

From *D* to *E* around the breast——inches.

From *F* to *G* around the waist——inches.

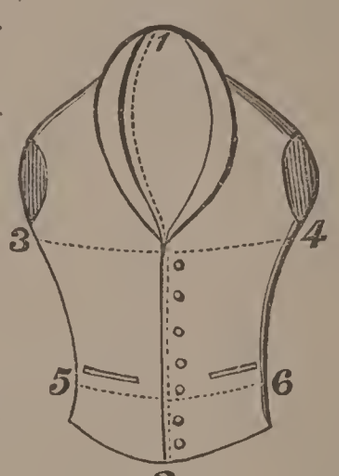


Fig. 172.

Vest—Height——Inches. Weight——Lbs. Take these measures over the waistcoat:

From 1 at centre of the back round the inside edge of the collar, to height required for top buttons——inches.

From top button to 2 for length in front——inches.

From 3 to 4 round the breast——inches.

From 5 to 6 round the waist——inches.

PANTS—Height——Inches. Weight——Lbs.

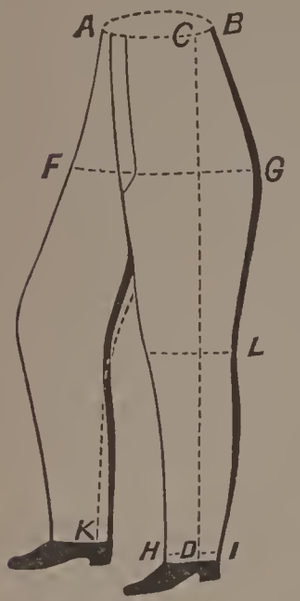


Fig. 173.

From *A* to *B* round the waist——inches.

From *C* to *D* top to bottom——inches.

From centre of fork, close up, down to *K* for length of leg inside, keeping the leg straight down——inches.

F to *G* round the seat ——inches.

From *H* to *I* round the bottom——inches.

L round the knee—— inches.

Fig. 174

BOYS' SUITS—Height ——Inches. Age—— Weight——Lbs.

From nape of neck to heel of boot—— inches.

Round the neck as for shirt-——inches.

From *H* to *I* for elbow point——inches.

On to *K* for length of sleeve——inches.

Round the breast, underneath the outside garment——inches.

Round the waist, underneath the outside garment——inches.

Length of the trousers inside the legs—measure as in trousers above, from centre of fork down to *K*——inches.

SHIRT—No. 1 round the neck——. No. 2 length of sleeve; measure with arm bent as in coat, from centre of back, round the elbow, to within one-half inch of the knuckle——. No. 3, round the hand——. No. 4, round the chest. Each measure to be in inches, and the number of the same to be given.

NUTS—SCREWING ON.—We have sometimes known nuts on threshing machines, circular saws, etc., to be found so tight that no wrench would remove them. This was because they had been held in the hand till they became warm, and being then applied to very cold screws in winter, they contracted by cooling after on, and thus held the screw with an immovable grasp. Always avoid putting a warm nut on a cold screw; and to remove it, apply a large heat-iron in contact with the nut, so as to heat and expand it, and it will loosen at once—or a cloth wet with boiling water will accomplish the same purpose.

NAILS, NUTS, SCREWS AND BOLTS—One of the component parts of a good farmer is mechanical ingenuity. Some lose half a day's valuable time for want of knowing how to repair a breakage, which an ingenious person could do in five minutes. A team and two or three men are sometimes stopped a whole day, at a critical season, for want of a little mechanical skill.

It is well for every farmer to have at hand the facilities for repairing. In addition to the more common tools, he should keep a supply of nails of different sizes, screws, bolts, and nuts; common cut nails are too brittle for repairing implements, or other similar purposes. Buy only the very best and anneal them, and they will answer all the ordinary purposes of the best wrought mails. To anneal them, all that is necessary is to heat them red hot in a common fire, and cool them gradually. Let them cool, for instance, by letting them remain in the fire while it burns down and goes out. One such nail, well clinched, will be worth half a dozen unannealed. Nothing is more common than for a farmer to visit the blacksmith shop to get a broken or lost bolt or rivet inserted, and often a single nut on a bolt. This must be paid for, and much time is lost. By providing a supply of bolts, nuts and rivets, much time and trouble may be saved. They may be purchased by the quantity at a low rate. These should all be kept in shallow boxes, with compartments made for the purpose, furnished with a bow-handle for convenience in carrying them. One box with half a dozen divisions, may be appropriated to nails of different sizes; and another, with as many compartments, to screws, bolts, rivets, etc.

OX BOWS—Fastenings.—Every one who has yoked a pair of oxen has experienced the difficulty of holding up one end of a heavy yoke while inserting the bow and keying it in. The labor is much lessened by attaching a spring snap or catch to the bow, so that when simply thrust through the hole in the yoke (fig. 175,) it fastens itself without any other attention. This is effected by inserting a large unannealed wire, so that it shall act on each side in a manner similar to the catch of an umbrella. A small iron plate with a hole in it as large as the bow, should be secured to the top of the yoke for these springs to rest upon.

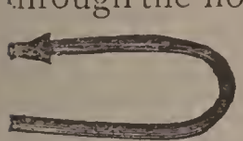


Fig. 175—Catch for Ox Bow.

Another mode of fastening the bow without employing a spring, is shown in fig. 176. A common butt or small door hinge is used for this purpose, and is screwed on to the top of the yoke, so that its movable part may cover about one-fourth or one-fifth of the hole. A notch is cut into the bow to correspond with this projecting edge of the hinge. On inserting the bow, this half of the hinge is thrust upwards, but drops and secures it as soon as it reaches the notch.

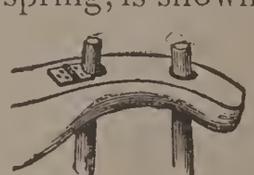


Fig. 176—Latch for Ox Bow.

PIN—To make stay in a garment.—Sometimes it is almost impossible to make a pin stay in one's clothes, and this is especially true when a garment has been made stiff with starch, like a shirt collar. When pins are new and straight they will work out very readily; but let them be bent a little and they will "stay put." Let valuable shawl pins and collar pins be bent a little, making them full of kinks, and they will seldom work out of a garment.

PUMPS—Chain, putting in order.—S. E. Todd states that chain pumps, by continued use, get out of order by the chain lengthening or becoming loose. It will then get entangled, and often stop the pump, and breakage frequently follows. To repair the difficulty, take out a few links from the pump, so that it will fit the reel tight, and it will run like a new top. If the tube has got worn too large for the chain, so it will not raise the water properly, procure some light sole or heavy harness leather, cut into circular washers a trifle larger than the buckets; make a hole or slit in the centre; take the chain apart and slip on one of the washers next above the bucket, having it fit snugly. There should be only about four or five to any well, no matter what the depth is, for if there are more than two in the tube at once when drawing, the suction will be too great. Trial will show how large the washers should be left.

PUMPS—To thaw frozen.—Some throw in salt, some heat iron rods, etc., but an incomparably better way is to place a small lead pipe within the pump, and pour in hot water by means of a funnel. The pipe should be as long as the frozen portion; and conducting the boiling water right on the ice, removes it with astonishing rapidity, say one foot per minute, the pipe settling as rapidly. Where pumps are liable to freeze, it is well to have a lead pipe always at hand.

PUTTY KNIFE—How to make a.—Take a piece of band iron about $\frac{1}{8}$ of an inch thick and an inch and a half wide, and six or eight long, and cut off the corners on one end, as shown by the accompanying figure, punch a hole in the other end to hang it up by; now grind the corners smoothly and true, and grind it flat on one side, and level it on the other side like a chisel. After grinding it, scour it bright on a whetstone of very fine grit, or with scouring grit, so that it will slip well on the putty; if the surface is coarse, rough or rusty, the putty will not slip on it, and putty cannot be spread well with it. This kind of a knife can be made in a few minutes, and is superior to all others.

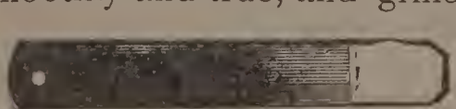


Fig. 177. Putty Knife.

RAWHIDE—Use of.—How few persons know the value of rawhide. It seems almost strange to see them sell all their "deacon" skins for the small sum of thirty or forty cents. Take a strip of well-tanned rawhide an inch

wide, and a horse can hardly break it by pulling back—two of them he cannot break any way.

Cut into narrow strips and shave the hair off with a sharp knife, to use for bag-strings; the strings will out-last two sets of bags. Farmers know how perplexing it is to lend bags and have them returned minus strings.

It will out-last hoop-iron (common) in any shape, and is stronger. It is good to wrap around a broken thill--better than iron.

Two sets of rawhide halters will last a man's life-time (if he don't live too long.)

In some places the Spaniards use rawhide log-chains to work cattle with, cut into narrow strips and twisted together hawser fashion. It is good to tie in for a broken link in a trace chain. It can be tanned so it will be soft and pliable, like harness leather. Save a cow and "deacon's pelt," and try it.

RAZOR STROPS.—Oxide of tin, as many know, has a fine sharpening quality, and it is extensively used for coating the leather of strops. When they have lost their efficiency, rub them briskly for a short time across a tin vessel, and enough will be imparted for the intended purpose.

RACK—For drawing wood.—The accompanying figure shows a convenient, spacious and substantial form for constructing a frame or rack for drawing cord wood on a two-horse farm wagon. The side pieces are twelve feet long, three by four inches, and rest on the ends of six cross pieces, which are two feet apart from center to center, and $1\frac{1}{4}$ to 5 inchesin size. They are secured to the side pieces by the iron shown *a* (fig. 179,) made of $\frac{3}{8}$ rod iron. At *a*, *b*, and *c*, the relative position of the pieces is shown. *A*, iron for holding cross-pieces; *b*, cross-section of side timbers; *c*, lower portion of stake; *d*, cross-piece. The stakes are 3 feet long, $1\frac{1}{2}$ by 3 inches at the bottom, tapering upwards to $1\frac{1}{2}$ inches square at the top. They are made of oak or other strong wood. The two at each end are secured with iron pins below the cross-pieces; the intermediate ones are merely set in and not pinned. The stakes incline about twenty degrees from the vertical, so as to give ample room between them.

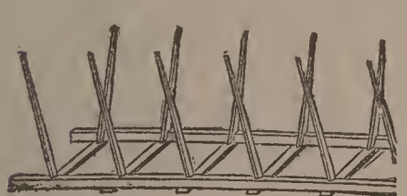


Fig. 178. Wood Rack.

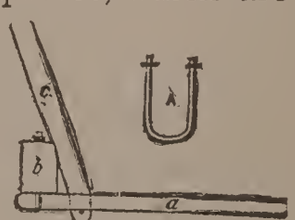


Fig. 179.

ROOFS—Leaks In.—During hot, dry summers, wood contracts, and leaks are often found in roofs. The trap-door at the house-top was thus made to leak badly. The carpenter proposed to batten it, but the writer directed that white lead paint, having enough fine, clean sand mixed with it to become about as thick as buckwheat batter, or thin mortar, should be put into the cracks, and not a drop of water has since passed them.

REFRIGERATORS—Out Door.—The accompanying figure represents an inexpensive contrivance for keeping milk, butter and other perishable articles in hot weather. Its size may vary with the wants of the owner, but the larger the ice-chamber is, the less frequently it would require filling, and if sufficiently large, it would keep ice all summer. The walls (see engraving) are double and filled with sawdust, as common in ice houses. The door, *a*, is double, with a space of three or four inches in it, filled with sawdust to exclude the heat. Two doors, one opening outward, and one opening inward, would be more perfect. Whether one or two, they should be made to fit very closely. These doors open into the refrigerator, which is kept cool by the ice above. The joists *b* must be stout, so as to hold several tons of ice above, provided a large sized building is erected. They are cut down towards the centre, so as to form a trough for the discharge of the water from the melting ice. On these joists galvanized sheet-iron is laid. On this the ice is deposited, and the iron being thus kept constantly cold, cools the air in the apartment below, by the natural descent of the cold air. By sprinkling sawdust over the iron floor, the thawing of the ice will be retarded, and thus its melting and duration may be entirely controlled, according to the depth of this layer of sawdust. The door *c* receives the ice, and the window *d*, kept always open, is for ventilation. There should be one in each end. The freer this ventilation the better the ice will keep—being covered with eight or ten inches of sawdust. It is better to line it with a few inches of sawdust at the sides, in addition to the sawdust walls. There is no use in a double roof.

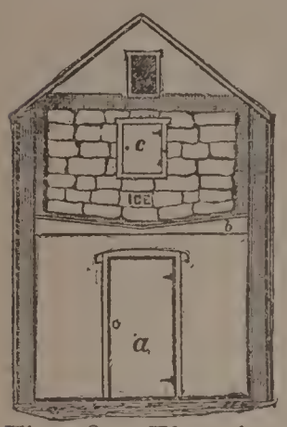


Fig. 180—Elevation and Section of Out-Door Refrigerator.

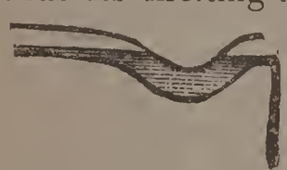


Fig. 181—Section of Discharge Pipe.

The water from the melting ice runs down into the trough, and thence into a lead pipe, which being bent, as shown in fig. 181, allows the water to escape freely, but excludes perfectly the warm air from without.

REIN PROTECTOR.—Annexed is a contrivance (fig. 182,) to keep the rein from getting under the end of the wagon tongue while teaming. The cord passes through the ring in the end of the tongue.

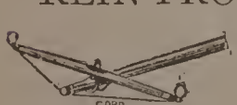


Fig. 182.

ROCKS—Removing.—A correspondent of the *Rural New Yorker* gives the following mode of sinking rocks:—"Dig by the side of the rock a hole large enough and deep enough to receive the stone and put it below the plow. When you have dug to the lower side of the rock, place a prop against it and the bank so as to hold it firm, and then dig under it a short distance to ascertain its size; then spade the hole to receive it. When all

is ready, take out the tools and pull out the prop, and if the rock does not drop, a pry on the opposite side will soon drop it; then cover it over. It requires much less hard work to let a rock drop down than to raise it out of its bed, and the labor of drawing it away is a clear gain. The thing is out of the way, and an eye-sore no longer."

SHINGLES—Fire-proof.—A correspondent states in the *Boston Cultivator*, that after an experience of eleven years, and using seven forges in his blacksmith shop, he has never seen a shingle on fire nor has a nail started. White-wash was made in a large trough, of a bushel of lime, half a bushel of salt, and five or six pounds of potash, The shingles were set in up to the bands for two hours, and then turned end for end. When laid on the roof they were brushed over at intervals of two or three years after. Quite dry shingles would absorb this wash the best, and with the bunches opened.

SHINGLES—Preserving.—Every farmer knows that the cost of the roofs of his buildings, as well as keeping them in repair, is a large item in his expenditures. Experiments should be made to lessen this cost. We observe the following in a late paper: Dip the shingles in a tub of white-wash made of lime and salt. Line with red chalk. The carpenter may get a little lime on his hands and linen pantaloons, but this difficulty is not a very formidable one. The lime will harden the wood, and prevent its wearing away by rain and weather, and will effectually exclude moss, a common hastener of decay. It is said that shingle roofs will last twice as long when treated in this way, as without it.

Whitewashing each successive layer of shingles, after nailing down, is sometimes adopted, but is less effectual. Whitewashing the roof when completed, is comparatively useless, as the lime, or but little of it, can enter between the shingles, where the water lodges and hastens decay.

Some may object that this operation is "troublesome," but so is nearly everything that is done in a thorough and consequently economical manner.

SHOEING—Frequent best.—Farmers are apt to insist on having their horses' shoes "put on to stay," making this point the only one insisted upon. The rapid growth of the hoof soon renders the best shoe unfitted for the foot. Shoes for farm horses should be so put on that they will stay tight, or nearly so, for five or six weeks, and then be taken off and re-fitted. It causes the expense of "setting" some five or six times more during the year, but saves many a lameness, besides keeping the feet always sound

SINK—Improved.—Many a housewife has washed her dishes for years on a table. The consequence is each time the table is soaked with grease and water, dripping on the floor and soiling dress and apron. Husband, if you have no sink, and if you desire to please your better-half, and save buying a few more yards of calico each year, also to improve the appear-

ance of your kitchen, then proceed to make, or have made, that necessary article, a sink. The one illustrated below is cheap and quite simple in construction. The sink *A* is 4 feet long, 2 feet 8 inches wide, and 7 inches high, made from inch oak wood, close jointed, to prevent leaking. The small frame shown in the back-ground is denominated the *dish rack*. Dishes will be washed in a pan on the bottom of the sink, and placed in an upright position on the grate *B*, and resting against the cross slats *D*. Knives, spoons, and all articles of this class are laid on the grate *B*. Standards *C C* are 1 by 2 inches; short ones 6 and long ones 14 inches in length above the top of the sink. Long slats *D* are $\frac{1}{2}$ by 1 inch. Those in which the slats *B B* are morticed are 1 by $2\frac{1}{2}$ inches, hard wood. A section is shown in fig. 2. It is 8 inches long, 1 by 1 inch square, and notched as shown. For plates eight, and for saucers ten notches are made in each slat—for plates the slats are placed four, and for saucers three inches apart. Placing dishes in a vertical position they soon drain off; consequently you can wipe more dishes, and those *cleaner*, without changing the towel. All refuse water passes through the discharge pipe *E*. Hang the wash-bowl upon a nail driven in the frame above *E*. The whole should be painted and varnished before being used. It should be about the height of a common table, and underneath a closet in which to keep kettles, dripping pans, bake pans, etc. Set the water pail on a bench at the side of the sink. Add whatever other conveniences you choose.

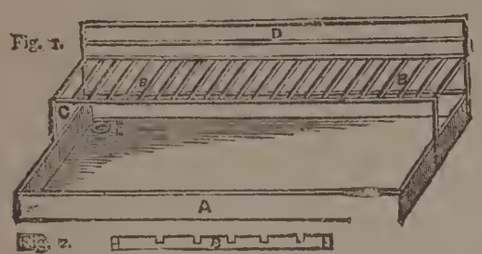


Fig. 183.—Improved Sink.

SMOKE-HOUSE—A GOOD.—We lately observed a well planned smoke-house on the premises of a good farmer, worthy of a brief description. It was about six feet square, the lower half built of brick, furnished with an iron lined door, and serving as an ash-house and place for the fire. The upper part, about four feet high besides the ascent of the roof, was made of wood. It was separated from the lower part by scantling joists, a space of two or three inches between them, through which smoke and air could freely pass, but suficient to catch any ham that might accidently fall, and thus save it from the fire. The upper part, as well as the lower, was entered by a door from the outside; this upper door may be kept locked, except when admitting or withdrawing hams; but the lower may be left unlocked for the hired man to build fires, without any danger of the contents above being stolen, as the thief cannot pass through the openings between the joists.

SNOW SHOVELS—WOODEN.—When shoveling snow, a person will be able to accomplish three times as much with a neatly made snow-

shovel, with less fatigue, also, than he could do the same work with a dirt shovel. When a spade or common dirt shovel is used for shoveling snow, the movements of the body and limbs cause more fatigue than the strength employed to shovel the snow. This is laboring at a decided disadvantage. When a laborer simply bends his body forward and moves his arms, as when using a shovel, he experiences certain degrees of fatigue, even if he performs no labor. Therefore, by having a large and light shovel with which he can raise a suitable number of pounds of snow, he is able to accomplish a vast deal of labor, with little fatigue.

The illustration herewith given (fig. 184) represents a wooden snow-shovel the blade of which is of some hard wood, not more than three-fourths of an inch thick, sixteen inches long and thirteen wide, with the entering edge dressed down to an even thickness of one-eighth of an inch, and covered with thin sheet-iron, extending back three or more inches, on the under side, and one inch on the upper side. The end piece should be of hard wood, three-fourths of an inch thick by one and a half inches wide, secured to the *upper side* of the blade, instead of being nailed to the end, as such shovels are usually made. If the end piece is secured to the upper side, it operates as a cleat to keep the blade from warping. When the piece is nailed against the end of the blade, all the strain, when the shovel is in use, comes directly on the few nails that hold it. For this reason a shovel will not last half so long with the end-stick nailed to the end, as it will when on the upper side.

Fig. 184—Snow Shovel.

The handle may be made of a piece of light timber, dressed out eight square; or a turned fork handle may be used. Two wood screws secure the handle to the blade. When the blade rests flat on the floor, the end of a handle four and a half feet long should be about twenty inches from the floor. This will give the shovel "the right hang." When such a shovel is used in the barn for shoveling chaff, or cut fodder, narrow pieces are nailed to the sides, either perpendicularly, or flaring outwards. Such a shovel is often much preferable to a small scoop shovel.

SNOW-PLOW.—The deep snow throughout the country the past winter, made a great deal of hard labor in shoveling by hand. A simple snow-plow may be made by any farmer in a hour or two, and will open paths by means of a single horse, with ease and rapidity. The height of a plow may vary with the depth of the snow, which being very uncertain, it should be sufficient. A foot will answer for nearly all cases. Take two pieces of plank or thick board a foot wide and about five feet long, more or less, dress off one end of each in a wedged form on one side, so that when

these two pieces diverge like a letter >, a width of three feet behind will be usually sufficient, and a board may be placed within, extending across so as to form a brace, by nailing. Sometimes a joint is made at the forward end and cross pieces of different lengths keyed in to make the plow wider or narrower as may be desired. A hook is attached to the forward end for the whipple tree, and a box seat placed on the top for the driver. By increasing or diminishing the distance between the hook and whipple tree, the forward end will run high or low as the nature of the snow may require. The driver has only to keep the horse in the right place, slightly guiding the plow by throwing his weight left or right. This snow may be used around the house, to front gate, to barns and other out-buildings, along village streets and elsewhere. A finishing touch may be given to these paths by hand when desirable.

STUMP MACHINE.—A simple contrivance for allowing a succession of efforts in the use of the lever, and is used for tearing out the roots of partly decayed stumps. It may also be applied to lifting heavy weights, and to various other purposes. Two pieces of strong, three-inch white oak plank, eight inches wide, and seven feet long, are connected at the ends, and are furnished with a movable leg. Two rows of holes are bored through them, to receive iron pins, which are to serve as fulcrum. A strong lever is furnished at one end, which is first fastened on the root of the stump, and then one of the pins is inserted under the lever. The lever is now elevated, and the other bolt is placed under it. It is next pressed down, and the first bolt elevated one hole higher, and so on till the stump is torn out. To prevent the lever slipping, a notch is made on its under side, on each side of the hook.

A more powerful stump-extracting machine, made on precisely the same principle, is exhibited by figure 185. The lever, *a*, should be a strong stick of timber, furnished with three massive iron hooks, secured by bolts passing through, as represented in the figure. Small or truck wheels are placed at each end of the lever, merely for the purpose of moving it easily over the ground. The stump, *b*, used as a fulcrum, has the chain passing round near its base, while another chain passes over the top of the stump, *c*, to be torn out. A horse is attached to the lever at *d*, and moving to *e*, draws the other end of the lever backward, and loosens the stump; while in this position another chain is made to connect *g* to *h*, and the horse is turned about, and draws the lever backward to *i*, which still further increases the loosening; a few repetitions of this alternating process tears out the stump. Very strong chains are requisite for this purpose. Large stumps may require

Fig. 185.

an additional horse or a yoke of oxen. Where the stumps are remote from each other, iron rods with hooks may be used to connect the chains.

The power which may be given to this and to all other modes of using the lever, as we have already seen, depends on the difference between the length of its two arms. A yoke of oxen drawing with a force of 500 pounds on the large arm of a lever 25 feet long, will exert a force on the short arm of six inches, equal to 50 times 500 pounds, or 25,000 pounds, on the stump.

STENCILING LETTERS—On portable articles.—Every one ought to have his name stenciled on his bags, umbrellas, buffalo robes, and all such articles that are liable to be lost easily.

Mark out the letters or figures on a straight piece of tin, or sheet of lead or copper, and cut them through with a sharp chisel by placing the tin on a smooth plank of hard wood. Prepare some thin paint, and lay the name on the article to be stenciled, and apply the paint by raising the brush up and down instead of drawing it back and forth.

The reason why names are blotted badly is because the paint is too thick or is put on too abundantly. There should be but a small quantity of paint in the brush in order to do it well, and the paint should be very thin.

TABLES without castors should always be carefully lifted from one place to another. Nothing destroys a table more rapidly than shoving it on its legs across a floor.

TACKLES AND LADDERS.—Tackles are very useful on a farm; they save much heavy lifting; they ought to have two blocks, and a three-quarter or inch rope will answer. It saves very much hard labor. It can be used to raise beeves and large hogs, and for hoisting corn up in the crib. Place a strap across from one handle to the other on the basket, leaving it long enough to throw over the side of the basket when filling, and having the tackle overhead and two baskets, you can unload corn very fast—for this you need a large hook on the lower block; but if you want to raise or lower bags, you need a chain with rings on each end (such as are used in grist mills) and slip-noose your bags. For a crib or granary overhead, nothing is preferable to a good tackle; it costs but little, and it is best to have hooks on both block. Ladders, too, are very useful on a farm, and have often saved buildings from fire; their cost is but trifling. For a long ladder they should be two feet wide at the bottom and eighteen inches at the top, and it is better to have flat pieces for the top, middle and bottom, pinned through the ends outside; smaller ladders should be narrower. Seasoned white oak rungs are best. Inch holes are large enough, if you get a good straight splitting chestnut the right size; be careful and you can split it, or you can saw it, which is the best, provided you have a good rip-saw. Cold

chisels are much needed on a farm, but seldom seen. Socket wedges are very useful to split rails, etc.

TOOLS IN PLACES.—Farmers who have been in the practice of leaving their tools exposed to the weather the past season, should employ the first leisure evening in computing the relative advantages of exposure and shelter. Different implements are variously affected. A crowbar is only rusted by leaving it in the field; but that rust sticks to it all the next year, and makes rough and unpleasant handling. A spade and hoe are rusted at the blade, and hence do not run bright, easily, and clear through the soil afterwards; and the handle at the socket becomes partly decayed, and finally breaks off. Figure up the cost of allowing a good hoe to become rusty, so that the man who uses it afterwards has to knock off the adhering soil a hundred and fifty times a day, or 1,500 times in ten days, besides only doing two-thirds of a day's work. Would it not be cheaper to carry in the hoe at night? Do you remember how long you hunted for it in the morning? Implements with many joints and pieces, as plows, harrows and cultivators, are more injured and rotted, and those like mowing machines, which run by gearing, to a still greater degree, for all the difference between free and smooth running cog-work that has scarcely any friction, and a heavy, creaking, thumping motion, hard and weary for teams, results often from the rusty surfaces.

VENTILATORS—For grain in bins.—Unless grain is very dry when it is stored in large bins, it is very liable to heat more or less, and to become musty, which will injure it for market or for home consumption, or for seed. It is usually found to be very difficult to keep buckwheat in a bin during the warm weather of spring and summer, because it will heat and become mouldy.

In order to prevent grain from heating while it is in bins, saw a round hole about six inches in diameter in the bottom of the bin, and place a sheet iron ventilator, like the accompanying illustration, over the hole; then by having small windows in the sides of the granary, there will be a complete circulation of air through the grain.

Fig. 186. Sheet-Iron Ventilator for grain bins.

This kind of ventilators may be made of either tin or sheet-iron, about eighteen inches long and six inches in diameter at the base, and made in the form of a cone, and the iron must be punched full of small holes, as in the engraving. In case a bin is a long one, the ventilators ought to be about four feet apart.

VENTILATORS—Improvement in.—Let a hole be sawed through the floor in the bottom of the bin, about one foot square or more, and nail a piece of fine wire cloth over the hole. This will admit the air and hold the grain, and is as good as the sheet-iron ventilator.

VENTILATORS—For indian corn-cribs.—Unless Indian corn is very ripe and dry when it is husked and put in the crib, and unless the crib is quite narrow and airy, Indian corn in the ear is very liable to be damaged more or less by heating; and when the cribs are made over the hog sty or piggery, the corn is apt to be very much damaged by the aqueous vapor which rises from the pen beneath the corn, and which keeps it damp. Many good farmers contend that it is not at all practicable to keep Indian corn well in cribs over a piggery; but it can be done, as my own experience has fully proved.

The accompanying figure represents a ventilator that I was accustomed to use in my cribs when I was engaged in farming operations, which was placed lengthwise of the crib over a long opening in the floor. It hardly needs any description. The end pieces are about six inches wide, three feet long, bored full of two-inch holes, and slats four feet long and three inches wide are nailed to them. As soon as the crib is filled to the top of the ventilator, another one is placed on the top of it; in this way ventilators are added as the crib is filled with ears. The ventilators are not fastened to the floor, as the ears of corn will keep them in place.

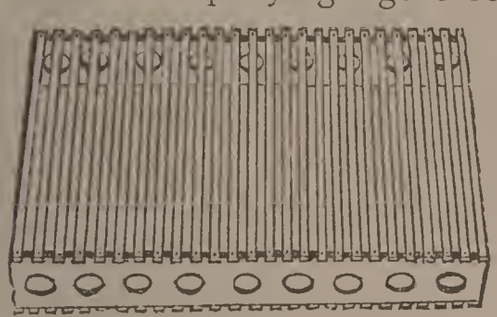


Fig. 187. Ventilator for Indian Corn in the Crib.

All the vapor from the piggery below, as well as from the middle of the crib, will rise through these flues, and pass off into the atmosphere beneath the eaves of the building.

WAGON OR WHEEL JACK.—For greasing wagons and oiling carriages, a simple contrivance, which one person can apply in a moment without difficulty, is needed. Many forms of construction have been adopted and recommended, but we have found nothing better than the one figured in the accompanying engraving. It is made of a strip of plank, two and a half or three feet high, and five or six inches wide, set upright on a shorter and rather wider piece, morticed in and braced. A slit an inch and a half wide is sawed part way down, and a cross piece is spiked on at the top to make the two parts firm. The lever works in this slit on an iron pin or rod. A small chain is secured by a staple near the base of the upright, and a hook attached to the handle end of the lever. To use it, place the short arm of the lever under the axle near the wheel, then while bearing down with the right hand on the lever, hook the chain (held in the left hand) at any suitable link to the hook, and the wheel is then suspended from the ground. The whole is done in a

Fig. 188.—Wagon or wheel jack.

moment, without moving a step. Several holes should be made in the upright (not shown in cut) to adjust it to different heights.

WALL AND BOARD FENCE.—In many localities it is desirable and convenient to build a fence, the lower portion of which is stone and the upper of boards. We do not know of one that possesses so many advantages as the one shown herewith. The posts, B B B, are made from plank two inches thick and one foot wide, and of any length to suit the height of the fence. The portion above the wall is tapering, as shown in fig. 190. R is a board six inches wide, the lower edge of which is nailed on the post, two and a half feet from the ground. A is a board four inches wide, and placed eight inches from the lower one.

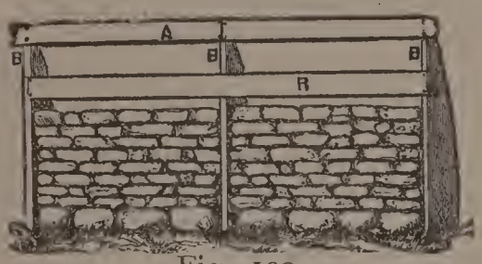


Fig. 190.

Directions for building a fence: First, set the posts B in the ground; two feet will be about the depth; nail on the boards, or the upper one at least, when you are ready for laying up the wall. The nearness of the posts to each other and the width will enable you to use a great many round or cobble stones in its construction, with a certainty of their remaining.

VELOCITY OF WATER IN TILE DRAINS.—An acre of land, in a wet time, contains about 1,000 spare hogsheads of water. An underdrain will carry off from a strip of land about two yards wide, and one eighty rods long will drain an acre. The following table will show the size of the tile required to drain an acre in two days time (the longest admissible,) at different rates of descent; or the size for any larger area:

Diameter of Bore.	Rate of Descent.	Velocity of current per second.	Hogsheads discharged in 24 hours.
2 inches.	1 foot in 100.	22 inches.	400
2 inches.	1 foot in 50.	32 inches.	560
2 inches.	1 foot in 20.	51 inches.	900
2 inches.	1 foot in 10.	73 inches.	1290
3 inches.	1 foot in 100.	27 inches.	1170
3 inches.	1 foot in 50.	38 inches.	1640
3 inches.	1 foot in 20.	67 inches.	3100
3 inches.	1 foot in 10.	84 inches.	3600
4 inches.	1 foot in 100.	32 inches.	2500
4 inches.	1 foot in 50.	45 inches.	3500
4 inches.	1 foot in 20.	72 inches.	5600
4 inches.	1 foot in 10.	100 inches.	7800

A deduction of one-third to one-half must be made for the roughness of the tile or imperfection in laying. The drains must be of some length to

give the water velocity, and these numbers do not, therefore, apply to very short drains.

WATER—Suggestions about conducting.—It frequently happens that it would be very convenient to carry water, in a conductor-pipe or trough, from a well, across the highway to a watering trough, or to a mortar-bed, six or eight rods distant from the well. There are two ways in which conductors may be arranged to carry it very conveniently.

One way is, to set up four posts around the well and make a platform on the top of them, four, six, or twelve feet high, and set the pump on the top. Then the water can easily be carried ten rods, or more, distant from the well, in small open troughs or conductors, made by nailing two boards together like an eave-trough. The conductor may be supported by small posts set in the ground, and may be out of the reach of cattle.

Another way is to set the pump on the platform, a few inches higher than the trough where the water will be received, and conduct it in water-tight pipe from the top of the platform down to the ground, and then, just below the surface of the ground to the place where it is to be discharged, when the pipe may be turned up so that the discharging end will be almost as high as the pump.

If the pump should be a forcing and lifting pump, one end of a pitman may be attached to the handle of the pump and the other end to a handle in a post, near the ground; then the pump could be worked without ascending the platform.

But if the pump is a chain pump, a small pulley with a groove in the periphery, may be put on the journal where the crank is, and a corresponding pulley on a journal set in a frame on the ground. Then a small chain belt which may be obtained at most hardware stores for a few cents per foot, will drive the reel of the pump.

A wooden faucet, or metallic one, such as are used in molasses barrels, may be inserted in the side of the pump-pipe or penstock, from which water may be drawn while the operator is standing on the ground. Such an arrangement of water fixtures will cost but little, and will sometimes save a great amount of labor.

WATER—Bringing up hill.—A correspondent has used a machine for two years to bring water eight rods up hill, without a cost of ten cents for repairs. A post at each end supports the wire, which is about the size of telegraph wire. At the spring it is fastened six or eight inches above the water. It is strained tight. A plank wheel with a groove is turned by a crank about eleven inches long. Two common door pulleys are attached to the ends of a piece of iron (weighing about two pounds,) bent like a semi-

Fig. 191. Bringing Water up Hill.

circle, the ends holding the vessel bending over one side, so that it will hang on the wire by the wheels. The pail or bucket is of tin, with parallel sides, the ears one-third down; one side slightly loaded, so that the bottom will not strike the water flat, or it will lift the pulley from the wire. A small copper wire, attached to the bucket, runs parallel with the other wire, and passes in the same direction through the upper post, where it winds on the wheel. If the large wire is stretched well, the posts may be fifty feet apart. The supports are turned up at the ends, and are flattened about the size of the wire, with a notch to lay the wire in. The last post and brace should be eight or ten feet from the spring, and with a steeper inclination.

WATER UP A SLOPE—PUMPING.—Below is an inquiry published some weeks since, to which we have been favored with the following answer:

Fig 192.

Can I bring water six or eight rods by a suction pump, if the pump stands on ground six feet above the surface of water in the well or spring? Would it be better and cheaper than to build a cistern?

Answer.—Lay the pipe in the direction of A B C D, fig. 192, or in any other direction touching A C D. C being lower than A, water will not flow back to it. Lay before frost. A. Spring—D. Pump—Dotted line, Level.

WEDGES—REBOUNDING.—Many of our readers cut and split large wood in winter. When the logs are icy, some of them are annoyed by the wedges rebounding or flying back. Ashes dropped in will usually prevent it, but ashes are not commonly at hand in the woods. Take a piece of dry bark and set it in the opening, then set in the wedge anew, so as to split this bark, and it will prevent any further trouble.

WIND-MILLS.—The force of wind may be usefully applied by almost every farmer, as it is a universal agent, possessing in this respect great advantages over water-power, of which very few farms enjoy the privilege.

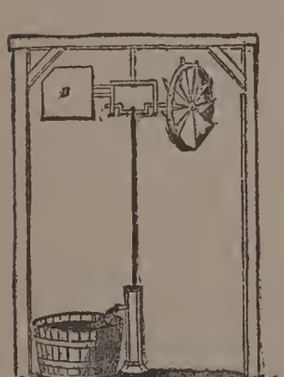


Fig. 193.—*a*, wind-mill; *b*, vane; *i*, pump-rod.

Wind may be applied to various purposes, such as sawing wood by the aid of a circular saw, turning grindstones, and particularly in pumping water. One of the best contrivances for pumping is represented by fig. 193, where *A* is the circular wind-mill, with a number of sails set obliquely to the direction of the wind, and always kept facing it by means of the vane *B*. The crank of the wind-mill, during its revolutions, works the pump-rod, *I*, and raises the water from the well beneath. In whatever direction the wind may

blow, the pump will continue working. The pump-rod, to work steadily, must be immediately under the iron rod on which the vane turns. If the diameter of the wind-mill is four feet, it will set the mill in motion even with a light breeze, and with a brisk wind will perform the labor of a man.

Fig. 194.

Such a machine will pump the water needed by a large herd of cattle, and it may be placed on the top of a barn, with a covering, to which may be given the architectural effect of a tower or cupola, as shown in the annexed figure 194.

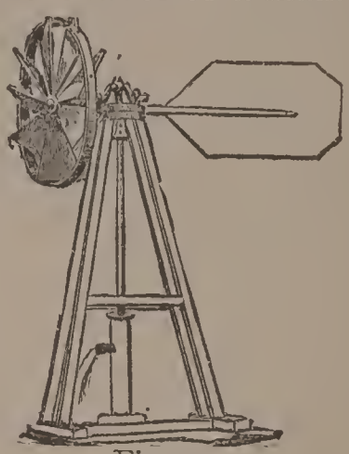


Fig. 195.

A more compact machine, but of more complex construction, is shown in fig. 195, where the upper circle moves round with the wheel and vane on the fixed lower circle, to which it is strongly secured so as to admit of turning freely. In other respects it is similar to the preceding.

In all wind-mills it is important that the sails should have the right degree of inclination to the direction of the wind. If they were to remain motionless, the angle would be different from that in practice. They should more nearly *face* the wind; and as the ends of the sails sweep round through a greater distance and faster, they should present a flatter surface than the parts nearer the centre. The sails should, therefore, have a twist given them, so that the parts nearer the centre may form an angle of about sixty-eight degrees with the wind, the middle about seventy-two degrees, and the tips about eighty-three degrees.

WINDOWS should always slide easily, and without rattling. Glass is often broken by attempting to raise those which move with difficulty; and no one admires the cold currents and music of those which are constantly rattling. A little time employed occasionally in making them right is an economical expenditure.

WOOD CARRIER.—The following is a description of a frame or barrow for conveying wood by hand from the wood-house to the fire. It does away with the necessity of piling the sticks on the arm, one by one, and then carrying them into the house, the wood being placed at once upon the frame, where it is not lifted until the frame is filled (fig. 196.) When wood has been dusted or covered with snow, it is easily knocked off by striking two sticks together before placing upon the frame. It is made in a manner quite similar to the common saw-buck, the sides being not quite so wide apart, and longer above the round

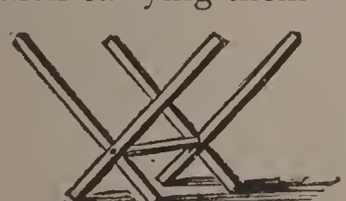


Fig. 169. Wood-Carrier.

that holds them together. It consists of four strips of hard-wood, one inch thick, four inches wide, and four feet long---crossed eighteen inches from the lower ends, nailed and clenched with wrought nails. An auger hole, an inch and a fourth in diameter, is bored through at the crossings and a round connecting rod, fifteen inches long, inserted.

WIND-MILLS—FORCE OF.—The force exerted by wind mills will vary greatly with the velocity of the wind. The following table shows the pressure against a fixed surface; from the velocity given in this table, the average velocity of the sails must be deducted, and the remainder will show the real force exerted:

Miles an hour.	Pressure in lbs. on square ft.	DESCRIPTION.
1	.005	Hardly perceptible.
2	.020	Just perceptible.
3	.045	
4	.080	Light breeze.
5	.125	
6	.180	Gentle, pleasant wind.
7	.320	
10	.500	Pleasant, brisk wind.
15	1.125	
20	2.000	Very brisk.
25	3.125	
30	4.500	Strong high wind.
35	6.125	
40	8.000	Very high.
45	10.125	
50	12.500	Storm or tempest.
60	18.000	Great storm.
80	32.000	Hurricane.
100	50.000	Tornado tearing up trees and sweeping off buildings.

WOOD JACK—A CONVENIENT.—One of the best plans for a jack for holding fire-wood, when splitting it into suitable billets for the cook-stove, is shown by the annexed engraving which represents a section of a hollow log, about ten or twelve inches long, secured to a piece of thick plank by means of four wooden pins passing through the plank into, or outside of the hollow piece of log. Almost every farmer meets with hollow trees that are so exceedingly tough and hard to split into firewood, that pieces of them are good for no other purpose; and they will last a long time, as the grain of the timber appears to be almost doubled and twisted together. Sometimes, if the grain of the wood is straight, so that one blow with the

Fig. 197. Wood Splitting Jack.

ax will open the log, a billet of hard wood should be pinned on the upper end, to receive a part of the blow of the ax, whenever it passes through a billet of fire-wood more easily than the laborer anticipated.

CROWS AND SKUNKS—To DESTROY.—Take one dozen hen's eggs and break a small hole in either end, and with a small stick insert a small quantity of strychnine, then place them about a cornfield, and you will have a dozen or more dead crows in the morning. The same remedy will answer for skunks by placing the egg in the hole. Be careful not to lay it where anything else will take it.

WOOL TABLE.—A correspondent furnishes the following description of a wool table which he has used several years with satisfaction. It consists of four boards, six feet long and one foot wide, with the exception of the board for the bottom of the box, which is ten inches. This is large enough for Merino fleeces weighing four to six pounds; twelve inches would be sufficient for the largest coarse-wooled fleece. These are laid on two pieces of three by five scantling, three feet ten inches long, and the first, *a*, and third one, *b*, (fig. 198, the bottom of the box,) are nailed; the other two boards, *c*, *c*, are fastened to *b* with hinges; *d* is a piece of board nailed at the end of *b* to bring the sides of the box (*c*, *c*,) together, which are held there by catches. It is supported by four legs, which are movable, and when stored away occupies but little space. The twine is passed up through the bottom of the box near *d* (fig. 199,) and across the bottom in grooves, so that the wool will not disturb them, and fastened by drawing them down in notches made with the saw. The dotted lines show the grooves.

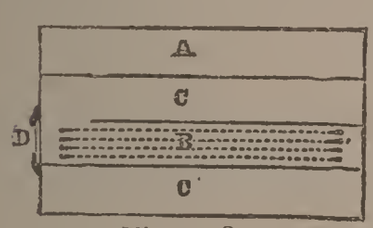


Fig. 198.

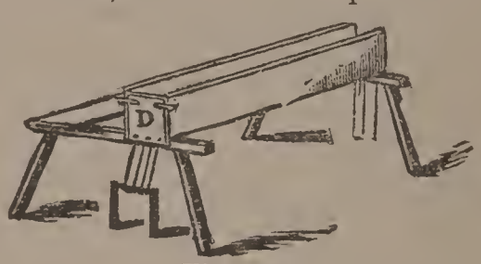


Fig. 199.

In using, the fleece is laid on in the usual way, and the sides rolled together; then the sides of the box are raised and held by the catches, (forming a box;) the fleece is then rolled so as to leave the shoulder exposed to view, and tied; the catches are then raised, and the sides of the box dropped, leaving the fleece at liberty on top of the table. The advantages of this table over those commonly used with a box at the side, are, the box at the side is in the way when rolling the fleece; it saves the trouble of working the fleece in and out of the box, besides often tearing it, and is much easier to construct, and less expensive.

WORK-SHOPS AND STORMY DAYS.—Every farmer who has boys should provide them a work-shop. It may be a building erected on purpose, or else partitioned off from the carriage-house, corn-house, or other

out-building. Let it be neatly made, and not unpleasantly situated, for it should be attractive and not repulsive to those for whom it is intended. It should be tight, and furnished with a small stove, so as to be comfortable in winter. It should be provided with a work-bench and vice, a shaving-horse for using the drawing-knife, and perhaps a small foot-lathe. The two latter are convenient but not essential. The tools should be two or three planes, augers of different sizes, a few chisels, a brace-bit, drawing-knife, saw and hammer. A small part of these will answer, and others may be added—the cost of the tools varying from five to twenty-five dollars.

Such a work-shop will afford several important advantages. The greatest is the assistance it will render the cause of *practical education*. The best inheritance any man can leave his children, is, not wealth to support them, but *the ability to help and care for themselves*. A young man whose natural ingenuity is so developed by practice that he can at any moment repair a rake, adjust a scythe, fit in a new hoe-handle, get a clock in running order, sew a broken harness, make a door-latch fasten easily, set a gate in good swinging condition, sharpen a pen-knife, give edge to a pair of scissors, mend an umbrella, repair a cistern-pump, whitewash a ceiling, paper a room, stop a leaky roof, make a bee-hive, bottom a chair, and black his own boots, will pass through the world more comfortably to himself, and profitably to those around him, and be far more worthy of the hand of the finest young woman in the country, than the idle and sluggish pretended gentleman, with pockets full of cash earned by his father, and who is obliged to send for a mechanic for all these things, which he is too helpless to perform himself. Dr. Franklin said, "if you want a good servant, serve yourself;" and, "if you wish your business done, *go;* if not, *send;*" and these sayings apply with especial appropriateness to such as have those jobs to perform, commonly known as "odds and ends."

Another important advantage afforded by such a work-shop is its moral influence in furnishing pleasant employment to boys during rainy or stormy weather, or other leisure hours, and lessening the temptation to frequent taverns, and to attend places of diversion—often leading to the most pernicious habits.

Another, is the actual saving of expense to the farmer, in having around him ingenious boys, who will repair immediately any broken article, and save the cost of carrying it to the neighboring village, and the delay and inconvenience, often much greater, of waiting till it is mended. They will be able also to manufacture many of the simpler wooden implements required for farm use.

To keep every part of a farm and premises in the best and neatest order, cannot be accomplished unless the owner or his sons are of ready and

active hands. Those who depend on hired men to perform the innumerable little services which this condition of a farm requires, will find that these services must be connected with an amount of constant observation and thought which cannot be secured by simply paying wages. It is therefore essential to educate the young managers to use their own hands, and become habituated to hand-work and thinking together; and the various operation, connected with the work-shop will be found a most important auxiliary in accomplishing this very desirable result.

HYDRAULIC RAM IN OPERATION.

The various uses of the Ram are at once obvious, viz: For the purpose of irrigating lands, supplying dwellings, gardens, factories, engines, railroad stations, stock yards, etc., with running water. The Ram can be placed in a pit and the pipes should be under ground for protection against frost or other injury.

HOUSEHOLD ECONOMY.

BASKETS should never have any wet substances placed in them, such as apple parings, or anything that will wet and decay the splints, and spoil their appearance.

BED-ROOMS.—To avoid giving discomfort to guests, every spare room should possess these essentials—a good-sized slat-bottomed bed-stead, furnished with a straw-bed and mattress over it (or feather bed if the weather is cold, or the guest prefers it,) over which a soft quilt is spread, then the clean sheets, bolster, pillows and more bedding than is really needful to be warm enough, as it is easy to lay off an extra quilt, but not always easy to ask for more; a wash-stand, large pitcher of soft water, wash-bowl, fine soap, slop-pail, two or more clean towels, two or three chairs, matches, pin-cushion and pins, brush and comb, looking-glass, and a few hooks for hanging garments. No bed-room should be without a Bible. Window curtains are essential; muslin are prettiest with a frill or valance, gathered in over the top, over the main part of the curtain. A clothes-brush, a pitcher of drinking water and a tumbler are often acceptable.

Cleanliness and ventilation are essential not only to the comfort, but to the life and health of the occupants. Beds, absorbing much of the insensible perspiration, need much airing and frequent change of their furniture A straw bed is probably most healthful, as the straw can be often renewed Mattresses should be overspread with a quilt or "comfortable," not only to make the bed softer, but because it can be washed and preserves the mattresses. Sheets need very frequent changing. Feather beds need daily beating up, and much ventilation. Many of the most particular housekeepers, from ignorance of the insensible waste of the body, leave their beds in a state of apparent neatness, but of real filth and poison. More than two persons should not occupy the same room, on account of the exhaustion of the air. Children are often crowded together and greatly injured in this way. The effects become apparent in loss of appetite, paleness, etc., but the cause is seldom suspected. The windows of bed-rooms should be open as much in the day as practicable, and at night if agreeable. Do not sleep with the door closed tightly.

Beds should be made higher at the head than at the foot. A hollow in

the middle of a bed is a certain sign of a lazy chambermaid. A true lady will always keep her own room as neat, or even neater than those rooms which are seen by company, and never leave it in a state which would require an apology for its appearance should it be suddenly entered.

BOARDS—To give a beautiful appearance.—After washing them very nicely with soda and warm water, and a brush, wash them with a very large sponge and clean water. Both times observe to leave no spot untouched, and clean straight up and down, not crossing from board to board; then dry with clean cloths, rubbed hard up and down in the same way. The floors should not be often wetted, but very thoroughly when done; and once a week dry-rubbed with hot sand and a heavy brush, the right way of the boards.

The sides of stairs, or passages on which are carpets or floor-cloths, should be washed with sponge instead of linen or flannel, and the edges will not be soiled. Different sponges should be kept for the above two uses; and those and the brushes should be well washed when done with, and kept in dry places.

BOOTS.—Ripping, to prevent.—It is stated that pegged boots, if dressed with petroleum between the soles and the upper leather, will be prevented from ripping.

BRASS—To clean.—Rub the tarnished or rusted brass, by means of a cloth or sponge, with diluted acid, such as the sulphuric, or even with strong vinegar. Afterwards wash it with hot water, to remove the acid, and finish with dry whiting.

BRASS AND COPPER VESSELS—To clean.—They require to be well and often cleaned, both inside and out. Indeed, the thorough cleansing of all vessels in which victuals are cooked is not only desirable in point of neatness and show—for most servants make a display of them—but it is actually necessary, as regards the flavor and the wholesomeness of the food cooked in them, whether solid joints, or soups, ragouts, etc. And these remarks apply more fully to vessels made of copper or brass than to tin or iron ware, the canker which they contract being absolutely poisonous. Brass and copper, whether cooking utensils, candlesticks, or other articles, are best cleaned with sweet oil and tripoli, or powdered bath brick, or rotten-stone A piece of flannel should be oiled, and then sprinkled with either of the above named powders and well rubbed over every part of the article, till every spot and soil is removed. They should then be polished with soft wash leather. The inner part of tinned vessels should be well cleaned with soap and water, and then thoroughly washed with clean warm water, and put away perfectly dry. A solution of oxalic acid in water gives brass a fine color; and vitriol and spirits of salts make brass

and copper very bright; but they soon tarnish, and therefore require more frequent cleaning. A strong lye of rock alum and water will also improve the appearance of brass.

BRASS KETTLES—To CLEAN.—Clean brass kettles, before using, with salt and vinegar, to avoid being poisoned by the verdigris

BREAD—STALE, TO MAKE FRESH.—Put a stale loaf into a closely-covered tin vessel; expose it for half an hour or longer to a heat not greater than that of boiling water; allow it to cool, when its freshness will be found restored.

BRICK HEARTH—To BLACK.—Mix black lead with soft soap and a little water; and then boil it; then lay it on with a brush; or mix the lead with water only.

BUTTONS—IN WASHING.—Complaint is often made that wringers tear off buttons When you wring your clothes draw them through so that the buttons lie flat while passing through the rollers, so that there will be no strain upon them.

CALICO—HOW TO WASH.—Some people have a contempt for calico. They are generally of the careless and slatternly sort. A woman who knows how to do up calico nicely will appreciate the clean, neat dress, however cheap. If a calico dress is washed carelessly, starched stiffly, sunned a day or two, and half ironed, it is not a very comely sight But if quickly dried in the shade, very thinly and evenly starched and ironed on the *wrong side*, so that it will not shine, it will look like a new dress for a long time. Many pretty blue prints and cambrics fade when washed in the usual way. If they are washed the first time in strong salt and water, or water to which a little beef's gall is added, the color will be set so that they will always be as handsome as at first, and can be washed ever after like other colored goods. Scald out all fruit stains, before washing, with boiling water.

CALICO FURNITURE—To CLEAN.—Shake off the loose dust, then lightly brush with a small long-haired furniture-brush; after which wipe it closely with clean flannels, and rub it with dry bread. If properly done, the curtains will look nearly as well as at first; and, if the color be not light, they will not require washing for years. Fold in large parcels, and put carefully by. While the furniture remains up, it should be preserved from the sun and air as much as possible, which injure delicate colors; and the dust may be blown off with a bellows.

By the above mode curtains may be kept clean, even to use with the linings newly dipped.

CANDLES.—Candles are made of various materials, but the first operation, in all cases, is the preparation of the wicks. The best candle wicks are made of cotton rovings, imported from Turkey in skeins. Four or more

of these, according to the intended thickness of the wick, are wound on a reel, from which they are again run off, and cut of the proper lengths. They are then dipped into melted tallow, and after rubbing with the hands, are placed straight and allowed to harden. They are next arranged upon the broaches ready for dipping. For mould and other candles that do not undergo the process of dipping, this last operation is omitted. In some cases the wicks are formed by twisting or plaiting the cotton together, or winding it round wires, which are withdrawn after the candles are made, thus leaving the wicks hollow; this was the method patented by Gay Lussac, for his stearine candles. In some instances, the cotton is steeped in metallic solutions. The object in all these processes is to produce a wick that will consume itself, and thus prevent the necessity of snuffing. Great care is taken to select a cotton that will yield the least possible quantity of ashes, or non-volatile matter after burning.

CARPET—To sweep.—Damp tea-leaves, scattered over a carpet before sweeping, improve the colors and give it a clean, fresh look.

CARPETS—Sweeping.—The practice of sweeping carpets too often wears them out rapidly. It is apparent to every one that a brisk daily brushing over the whole surface must of necessity wear away and carry off more woolly particles than the occasional stepping of feet during the day without the rubbing and scraping given by the broom. To permit sand and grit to accumulate on the surface, and to become ground into the fiber by the pressure of sole-leather, is, however, worse than sweeping. Carpets should therefore always be kept clean. If men object to large carpet bills, then they should provide themselves with slippers, and not walk on them with muddy boots. It is a matter of economy to them to pay $1 or $2 in the purchase of slippers, rather than a hundred or two for ingrain and Brussels. This perhaps would be a stronger consideration with some, and exert a more controlling influence, than frequent sharp reproofs from the mistress of the interior.

There are different ways of sweeping carpets. The most objectionable is performed as follows: The operator first places the broom perpendicular upon the floor; then with a quick, thrusting motion the lower part is pushed forward and thrown upwards, carrying the dust with it in large clouds, until the air of the room is filled with it. The brush of the broom, by a frequent use, thus becomes bent, somewhat in the form of a hook, as shown in the accompanying figure, 200, at the same time that it is gradually broken off and worn out.

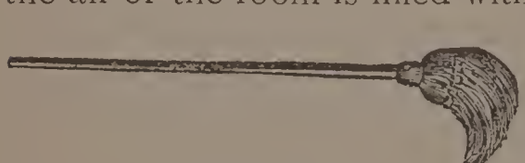


Fig. 200.

The dust which fills the air gradually settles upon chairs, tables bureaus, writing desks, cases of books, picture-frames, clocks, maps, looking-glasses,

etc. The process thus consists virtually in merely elevating a stratum of dust on the carpet and placing it on all these different articles of furniture. After some minutes the duster passes around and the stratum is removed to its original position on the floor, thus making a sort of perpetual motion resembling the great circulation of moisture from the earth to clouds, and from clouds to rain back to earth again.

Fig. 201.

A much better way for performing the work is to place the broom upon the carpet in an inclined position, with the handle inclining forwards; drawing it quickly over the surface in this position, and scarcely raising it from the floor, will prevent the rising of but very little dust. In order to do the work effectually, however, the motion should not be given by long strokes, but by a quick succession of short ones. It would be worth fifty dollars to any housekeeper who does not understand her business, to see these two modes distinctly performed. By the former or thrusting mode, the coarser dirt, or that which does not rise in the air, is shot ahead several feet, and spread over a large surface. By the latter or drawing mode, it is kept more compactly together, something like the winrow of hay in the meadow. The broom, instead of being bent around like a hook, as above stated, is kept straight and smooth, and lasts several times longer. Fig. 201.

In libraries, cabinets, etc., where dust might badly injure or wholly spoil the specimens and books, it is better to procure a patent carpet-sweeper, merely using a broom or brush to clean out the corners and sides.

CARPET—To put down.—The patent carpet-hooks, sold by the hardware merchants, are greatly superior to tacks, saving a great deal of painful drudgery in putting down the carpet, and not requiring to be taken out and replaced every time the carpet is shaken.

CHIMNEYS, on fire may be arrested in a great measure by throwing salt on the fire below, which partly extinguishes the flames; stopping the chimney at the top arrests the current and contributes to the same result. In case of a dwelling taking fire, every door and window should be kept closed, to keep the flames from spreading.

CISTERNS—Worms and lice in.—A couple of live fish thrown into cisterns will clean them of worms, lice and dirt.

CHARCOAL—Pulverized.—Is an excellent remedy for many purposes, and should be kept in every house. A glass jar with a wide mouth, and cork to fit it closely, is best to keep it in. A half-pint or so is large enough for most practical purposes. The coal should be freshly burned, and of such a character as to pulverize finely in a mortar, without leaving grit. Most kinds of *hard wood* are too hard, and bass-wood and pine are

too soft and dusty. We have never found anything equal to the "white wood" of New England, or the Tulip tree. Perhaps soft maple would do. Take a stick large enough to make the desired coal, place it in the fire till it just ceases to blaze, and then pound or bray the red coals in a mortar--which will, of course, immediately extinguish the fire. Place the powder in the jar or bottle, and keep it corked tight. It is excellent for indigestion, or any derangement of the stomach—a rounded teaspoonful is a full dose, and should be mixed with several times its bulk of water, and swallowed. The powder is excellent to rub the teeth with daily. We once tried it on a six months calf that had become fearfully bloated from over-eating green food. Saleratus was first given, but it could not be swallowed. Half a teacup of charcoal in water was then administered without difficulty from a junk bottle, the head being held up. In six hours the animal was perfectly well. All agreed in the opinion that without this treatment it would certainly have died.

CLOTHING.—If you have a small dress pattern, cut the three front breadths considerably shorter than the others. There is no economy in making the dress narrower than usual. A yoke waist generally requires less cloth than any other, as it uses up all the small pieces.

Always shrink dress braids before using, by putting first in scalding, and afterwards in cold water. Even after shrinking, care must be taken not to pucker the dress in binding it, but put the braid on "full."

To support the weight of the skirt, wear an under-waist of bleached muslin, with five large buttons sewed at intervals near the lower edge. The waist should be rather low in the neck. Button holes should be worked in the skirt-binding to correspond with the buttons. Persons who have worn this garment several years pronounce it indispensable.

The wrinkles in a cloth cloak or other cloth garments are removed by hanging it in a warm place.

When the nails in the shoes project upwards and become troublesome, they should be pounded down and the shoes be fitted with a pair of kid insoles, pasted in with a strong paste.

To preserve the smoothness and beauty of a muff, always carry it so that the ends of the fur point outward from the person.

A strip of the glazed fabric known as argentine, is neater, lighter, and more durable than the oiled-silk, commonly used for lining bonnets.

COFFEE-POT—How to choose.—The coffee-pot that is broadest at the bottom and narrowest at the top will always make the best coffee.

COTTON IN LINEN—To detect.—The presence of cotton in linen fabrics may easily be ascertained by immersing for two or three minutes a small strip (a square inch for instance) of the suspected cloth in a mixture

of equal parts of hydrate of potassa and water, when strongly boiling, after which it must be taken out and pressed between the folds of blotting paper. By separating eight or ten threads in each direction, their color may be readily seen. The dark yellow threads are linen, the white or bright yellow ones are cotton. A vessel of silver, porcelain, or hard glass, must be employed to contain the alkali. This process is simple and certain.

DISH-WATER AND SOAP-SUDS, instead of being appropriated to the formation of an interesting puddle at the kitchen door, should be poured at the roots of young trees, raspberry and currant bushes, and will accelerate their growth and augment the size of the fruit.

DISHES—WASHING.—Those who have cool water, and little of even that, dirty dish-cloths and wiping towels, a greasy dish-pan, and a shirking, slovenly and unsystematic way of doing, will generally dislike to wash their dishes as much as other persons will dislike to use them.

Provide plenty of hot water beforehand, and make up a good fire. Have a good supply of clean crash dish-towels. Scrape the dishes very clean, put the kettles to soak, put away the food remaining after the meal, and begin by washing the glass in clear hot water. There is no need at all of breaking tumblers in washing. Put them in the water side-wise, so that the water will run into them at once and expand them outside and inside at the same time—then they cannot crack. Wipe glass while hot, with a dry towel. After this put soft soap in the water, and provide rinsing water. Wash spoons before the crockery, while the water is clean—thus avoiding the risk of losing them among larger articles and throwing them out with the turbid dish-water. Change the water occasionally while washing dishes, and it will be neater—cleaner for the dishes and better for the hands. Knife-handles never should be put in water; they should be washed with a cloth above it, only dipping the blades. As the hands of working-women get accustomed to heat, so that they do not feel uncomfortable in water hot enough to dissolve the cement which fastens the handles af cutlery, it is best never to risk them in water at all. But India-rubber handles are considered safe, even in very hot water.

The outside of kettles should be washed as much as the inside. Scrape iron-ware with a circular piece of tin, bent up a little on one side to hold by; the medical instrument called "spatula," a broad knife, is equally valuable for this purpose, as also for cleaning plates, as it scrapes a much larger space at once than a common table knife.

DUST-PAN.—When you want a dust-pan, have it made to order, with the handle turning down instead of up, so as to rest on the floor and tip the dust-pan at a proper angle for receiving the dust. It is a great convenience, as you then do not have to stoop and hold it while sweeping.

Fig. 202. Self-supporting Dust-pan.

DOOR KNOBS.—To secure the paint around them in cleaning, place a piece of pasteboard with a hole cut to encircle them, and a slit to slip on.

EGGS—How to color.—If mottoes are to be inscribed upon the eggs, use the sharpened end of a white wax or adamantine candle. Having first submerged the eggs in hot water, write on them with the candle-end such words or draw such figures as you fancy. The wax or oil will serve the same purpose as what is termed a resist in the process of printing calicoes, and prevent the dye from adhering.

Now we shall like our eggs of various colors—red, to begin with. For the purpose Brazil-wood and also cochineal are used, either dye to be set with a little alum. Boil by preference in a tin vessel. Have your dye-stuffs well dissolved and strained from impurities before immersing the eggs, and then if you keep them stirring all the while they will be painted over evenly. If you want speckled eggs, dot about with white wax or oil, as you did for your mottoes, and the desired effect will be produced. A neater way, though, of engraving eggs is to dye them first whatever color you wish, and then with a pen-knife scrape upon them any device that occurs to you, leaving thus a tracery of white upon a colored ground. Logwood chips will produce a dark purple dye, to be set with a small bit of copperas. A good yellow may be gotten by boiling in onion skins steeped in hot water, or by taking two parts of black-oak bark and one part of hickory, and boiling in water, with a lump of alum for the mordant. Or, if you wish some eggs yellow and some green, first dye your eggs in a pan of hot water colored with tumeric tied up in a little muslin bag, and when you have dyed as many in that as you may wish, stir into it enough of druggist's blue-indigo composition to produce the desired shade of green. The analine colors yield the finest results with the least amount of labor. So strong are these colors, that some of them do not even require to be heated, but are soluble either in water or alcohol, and impart their brilliant hues when applied cold.

FADING—Colors, to prevent.—Dip new calico, pocket handkerchiefs, etc., in salt water.

FLAT IRONS.—If rough and smoky, will not stick to a starched surface, if rubbed over a flat surface of salt laid on a board or table.

FLANNEL—Washing.—To prevent flannels from shrinking and turning yellow, wash them in hot suds, and rinse in clear, soft, boiling water—standing till cool enough to wring out.

FLOOR-CLOTHS—To clean.—Sweep, then wipe them with a flannel; and when all dust and spots are removed, rub with a waxed flannel, and then with a clean one; use but little wax, and rub only enough to give a little smoothness. Washing now and then with milk, after the above sweeping and dry-rubbing, makes them look fresh. An oil-cloth should

never be scrubbed with a brush; but, after being first swept, it should be cleaned by washing with a large soft cloth and luke-warm water. On no account use soap, or take water that is hot; as either of them will bring off the paint.

FRAGMENTS OF BREAD, may be all saved by making them into toast and puddings, and they also make excellent pancakes, by soaking over night in milk, and then adding an egg or two and a little salt and flour.

FRICTION MATCHES.—Should never be left where mice can get them—they have sometimes carried them in among their nests of shavings and papers, and slight causes have set them on fire and burned houses. A lady was nearly burned to death by a fire from a match which bad been thrown on the floor, and which she fired by treading on it.

FREEZING PUMPS.—Pumps exposed to freezing are now usually made with contrivances to let off the water—one mode being to make a small hole in the pipe a few feet below the exposed part, so that the water will always run off before freezing. This hole may be stopped at other times of the year. Another way, which may be adopted for any pump, is to place a small nail or carpet-tack under the leather of the fixed valve, which will cause it to leak and let off the water. It is well where pumps are liable to freeze to keep a small lead pipe or other tube, with a funnel always on hand. Place this tube on the ice in the pump, and pour in hot water at the top. The tube carries the hot water directly on the ice, and it melts with great rapidity—a foot or more a minute—ten times faster than in any other way.

GILT FRAMES, if cleaned are soon worn and spoiled—to prevent which, preserve them by applying a transparent wash.

GLASS—How to wash.—If you do not want to break glass goblets, preserve dishes, etc., when you wash them, lay them *sidewise* in the hot water, and turn them over a few times; they will not break, even in boiling water, because all the parts will be expanded equally and at once. To break them it is only necessary to stand them up in the dish-pan and pour on hot water.

HAIR BRUSHES, are best cleaned by washing them in saleratus or soda water, which removes all the oily coating.

HANDS—To keep clean and smooth.—Procure a piece of pumice stone at the drug store, and grind one side smooth on a grindstone. When the hands are rough and dirty, wash them in soap suds, and rub them with the smooth side of the pumice stone. Keep the pumice stone wet when using it, as it will be more effective when it is wet than when it is dry.

INKS—Black.—*a.* Bruised Aleppo galls, six ounces; soft water, six pints;

boil together; add four ounces of sulphate of iron and four ounces of gum arabic. Put the whole of it in a bottle, and keep it in a warm place, shaking it occasionally. In two months pour it off in glass bottles, and add to each pint a grain of corrosive sublimate or three or four drops of creosote

b. Galls, one ounce; gum, one-half ounce; cloves, one-half drachm; sulphate of iron, one-half ounce; water, eight ounces. Digest with frequent shaking till it has sufficient color. A good durable ink, and will bear diluting.

INK—Cheap and excellent.—Take half an ounce of extract of logwood, ten grains of bi-chromate of potash, and disolve them in a quart of rain water, in a bottle kept uncorked. This is the whole process, and the cost will be about three cents a quart. But failure will result, unless the bottle is perfectly clean, and unless the ink is poured out into an inkstand perfectly clean from any other ink. Do not forget also to leave the bottle uncorked. Do not mistake chromate for bi-chromate of potash. Running the logwood in solution first through a fine strainer, is said to be effectual in preventing the sediment which sometimes adheres to the pen, but this the writer has not tried.

INK—Gold.—Honey and gold leaf equal parts; grind together upon a painter's porphyry-slab with a muller, until the gold is reduced to the finest possible state of division, and the mass becomes perfectly homogeneous, when it must be agitated with twenty or thirty times its weight of hot water, and then allowed to settle and the water poured off; this process must be repeated with fresh water two or three times, when the gold must be dried and then mixed up with a little weak gum-water for use. The brilliancy of writing performed with this ink is considerable, and may be increased by burnishing. Gold ink may also be made by mixing precipitated gold-powder with a little gum-water.

INK—Indelible.—This may be made much cheaper than purchased, as follows: Two drachms of nitrate of silver, added to four drachms of a weak solution of tincture of galls. Another: Nitrate of silver one drachm, mixed with a solution of half an ounce of gum arabic in half a pint of pure rain water. Moisten the cloth previously with a strong solution of pearl, or salt of tartar, and iron it dry.

INK SPOTS may be removed from linen by dropping melted tallow on them, and then washing.

HINGES—Creaking.—Doors hung on butt hinges often make an unpleasant noise by creaking. The best way to prevent it is to place a drop or two of kereosene, by means of a feather, on the top of the bolt connecting the two parts, as well as at the sides, working the door backward and forward at the same time. The oil will run down and the difficulty will cease.

HORSE-RADISH—To have in keeping.—Grate a sufficient quantity during the season, while it is green, put it in bottles, fill up with strong vinegar, cork them tight, and set them in a cool place.

KITCHEN ODORS.—Meat which has been slightly tainted may be restored to perfect sweetness, and the odor arising from it while boiling entirely prevented by throwing into the pot a few pieces of charcoal contained in a small bag. The odor of vegetables slightly affected may be prevented in the same way. Red pepper, and even black pepper, produces a similar but less perfect result.

KNIVES—Cleaning.—A small, clean potato, with the end cut off, is a very convenient medium of applying brick dust to knives, keeping it about the right moisture, while the piece of potato assists in removing stains from the surface. A better polish by this method can be obtained than by any other.

LAMP CHIMNEYS—To prevent cracking.—Place the chimneys in a pan and boil them. This seasons them, and they will last twice as long.

LAMP WICKS.—When the wick is too large for the lamp, pull out a few threads and it will go in.

LEATHER—To clean.—Mix well together one pound of French yellow ochre and a dessert-spoonful of sweet oil; then take one pound of pipe-clay and a quarter of a pound of starch. Mix with boiling water, and, when cold, lay it on the leather; when dry rub and brush it well.

LEATHER—To make waterproof.—Mix three parts of lard and one of resin or black lead and apply it. Boots or shoes when treated with it will soon after take the usual polish when blackened, and the soles may be saturated with it without danger of soiling the floor, as it does not rub off. This is an excellent recipe.

LEATHER—To restore softness to.—To restore the softness and pliancy of leather, which has become hard by having been wet, apply neat's-foot oil and rub it in. Castor oil is a good substitute for neat's-foot oil for softening leather-belts, boots and harness. But the best oil for harness is one quart neat's-foot oil, four ounces beef's tallow, and three table-spoonfuls lampblack; add four ounces beeswax for use in summer weather.

GLOSS ON LINEN.—To restore the gloss commonly observed on newly purchased collars and shirt bosoms, add a spoonful of gum-arabic water to a pint of the starch as usually made for this purpose. Two ounces of clean gum-arabic may be dissolved in a pint of water, and after standing over night, may be racked off and kept in a bottle ready for use.

LYE—To make.—Have a large tub or cask and bore a hole on one side for a tap, near the bottom; place several bricks near the hole and cover them with straw. Fill the barrel with strong wood ashes. Oak ashes are

strongest, and those of apple tree wood make the whitest soap. Pour on boiling water until it begins to run, then put in the tap and let it soak. If the ashes settle down as they are wet, fill it until full.

MARBLE FIREPLACES AND TABLES.—Never wash them with soap-suds—the potash of the soap decomposes the carbonate of lime, and in time destroys the polish.

MARKING CLOTHING.—Mark and number all clothing, bed-linen, towels, etc. Count up frequently silver, knives and forks, and all articles of value or in common use.

MEAT—To protect from fly.—An effectual way of excluding the fly is by using a wire meat-safe, or by covering the joints with a loose gauze or some thin cloth, and hanging them from the ceiling of an airy room. Pepper and ginger should be sprinkled on the parts likely to be attacked by the fly, but should be washed off before the joint is put to the fire.

MILK—To test the richness of.—Procure a long glass vessel—a cologne bottle or long vial. Take a narrow strip of paper, just the length from the neck to the bottom of the vial, and mark it off with one hundred lines at equal distances; or, if more convenient, and to obtain greater exactness, into fifty lines, and count each as two, and paste it upon the vial, so as to divide its length into a hundred equal parts. Fill it to the highest mark with milk fresh from the cow, and allow it to stand in a perpendicular position twenty-four hours. The number of spaces occupied by the cream will give you its exact percentage in the milk, without any guess-work.

MIRRORS—Spoiling.—It is a fact worth knowing, but which does not seem generally understood, that the amalgam of tin-foil with mercury, which is spread on glass plates to make looking-glasses, is very readily crystallized by actinic solar rays. A mirror hung where the sun can shine on it, is usually spoiled; it takes a granulated appearance familiar to housekeepers, though they may not be acquainted with its cause. In such a state the article is nearly worthless; the continuity of its surface is destroyed, and will not reflect outlines with any approach to precision. Care should therefore be exercised in hanging. If any of our readers have mirrors which seem to be spoiling, it would be well to ascertain whether the direct sunlight strikes them. If thus exposed, they can probably be saved from further injury by simply changing their position. The back as well as the front must be protected. A small glass hung in the window, where the rays strike it behind, is peculiarly exposed. The backs should always be covered where the beams are likely to touch it.

The great danger to looking-glasses, however, is in transporting them. Very expensive ones have been seriously injured by careless handling, when merely carried across the street. The men who move furniture are

seldom fully aware of these possibilities and need to be cautioned and watched. Frequently a man or boy may be seen in the street carrying a mirror in such a way that the full glare of a noon-day sun strikes and injures it. Owners of such articles would, as a rule, be able to keep and use them much longer, if they would exercise more caution in this regard. To résilver a pier-glass often costs as much as one-fifth of the original price of the article; while the common glass is seldom worth résilvering.

It is also well to avoid hanging a mirror near a stove or fire-place, where the radiated heat can reach it. If this precaution is neglected, granulation is likely to occur, even in a comparatively dark room, by the influence of warmth instead of light. A lamp or gas-jet, if placed too close while burning, though it may not crack the glass, will also often bring about the same injurious crystallization, and will even sometimes cause the amalgam to melt and run off.

MOLASSES—To IMPROVE.—The flavor of common molasses is much improved by boiling and skimming it before using.

MOTH—To PROTECT CLOTH AGAINST.—Reimann, in his *Faeberzeitung* recommends for this purpose steeping the cloth for twelve hours in a solution prepared in the following manner: Ten pounds of alum and twenty pounds sugar of lead are dissolved in warm water, the mixture being left undisturbed until the precipitate of lead sulphate is deposited. The clear liquor, now consisting of acetate of alumina, is then drawn off and mixed with one hundred and eighty gallons of water, in which a little isinglass has been dissolved. When well steeped, the goods are dried and finished by pressure or otherwise.

NUTMEGS—HOW TO SELECT.—Prick them with a pin. If they are good, the oil will instantly spread around the puncture.

OIL-CLOTHS—To KEEP LOOKING WELL.—Wash them once a month in skim-milk and water, equal quantities of each. Rub them once in three months with boiled linseed oil. Put on a very little, rub it well in with a rag, and polish with a piece of old silk. Oil-cloths will last for years if kept in this way.

PAPER HANGINGS—To CLEAN.—Cut into eight half-quarters a loaf of bread two days old; it must neither be newer nor staler. With one of these pieces, after having blown off all the dust from the paper to be cleaned by means of a good pair of bellows, begin at the top of the room, holding the crust in the hand, and wiping lightly downward with the crumb, at about half a yard at each stroke, till the upper part of the hangings is completely cleaned all around. Then go again around, with the like sweeping stroke downward, always commencing each successive course a little higher than the upper stroke had extended, till the bottom is finished. This operation,

if carefully performed, will frequently make very old paper look almost equal to new. Great caution must be used not by any means to rub the paper hard, nor to attempt cleaning it the cross or horizontal way. The dirty part of the bread, too, must be each time cut away, and the pieces renewed as soon as at all necessary.

PAPERED WALLS—To extract the grease from.—Dip a piece of flannel in spirits of wine, rub the greasy spots gently once or twice, and the grease will disappear.

PEACHES—How to peel.—Take a kettle of very strong lye, and heat to boiling; take a wire cage—similar to a corn-popper—fill it with peaches and dip into the lye for a moment; then into cold water. With a coarse towel wipe each peach, and the rind will peel off smoothly; then drop into fresh cold water, and the operation is complete. You need have no fear of injuring the flavor of the peach.

PICTURE-FRAMES—To re-touch.—To re-touch the rubbed parts of a picture frame, give the wood a coating of size made by dissolving isinglass with a weak spirit. When nearly dry, lay on some gold leaf; and polish, when quite dry, with an agate burnisher, or any similar substance.

PIE-PLATES AND PHIALS—To cleanse.—Bottles and phials that have had medicine in them may be cleansed by putting ashes into each one, and immersing them in a pot of cold water, then heating the water gradually until it boils. When they have boiled in it an hour, take it from the fire and let them remain in it until cold; then wash them in soap-suds, and rinse them in pure water till clean. Pie-plates that have been used much for baking are apt to impart an unpleasant taste to the pies, which is owing to the lard and butter of the crust soaking into them and becoming rancid. It may be removed by putting them in a brass kettle with ashes and cold water and boiling them in it for an hour.

PLATES—Cleaning dinner.—Every dish-washer is familiar with the process of scraping adhered portions of gravy, etc., from the surface of the plates preparatory to washing. The rounded edge of a common table knife does the work imperfectly. Skillful housekeepers inform us that long, straight, flexible blades, like the spatula of druggists, perform this work more rapidly and perfectly. A task which has to be done three times a day, or more than a thousand times annually, should have every appliance for rendering it easy and perfect.

PUTTY—Old, to remove.—Moisten it with muriatic acid, and it will immediately become soft.

RAZOR STROP—To Renovate.—*a.* Rub a little clean tallow over the surface, and then put on it the light top part of the snuff of a candle; rub it smooth. Excellent. *b.* Rub the strop well with a piece of soft pewter or lead.

RIBBONS AND SILKS—To preserve.—Ribbons and other silks should be put away for preservation in brown paper; the chloride of lime used in manufacturing white paper frequently produces discoloration. A white satin dress should be pinned in blue paper, with brown paper outside, sewn together at the edges.

RING—Tight, how to remove.—Thread a needle flat in the eye with a strong thread, pass the head of the needle with care under the ring, and pull the thread through a few inches toward the hand; wrap the long end of the thread tightly around the finger regularly all down to the nail to reduce its size, then lay hold of the short end and unwind it. The thread repassing against the ring will gradually remove it from the finger. This never-failing method will remove the tightest ring without difficulty, however much swollen the finger may be.

REEL—Clothes line.—This is easily made, and is a great convenience. A strong box nailed to the end of a post or against the building, with a crank through it, is all that is required. Fasten one end of the line to the crank in the box, and you can always have your line in good order when washing day comes.

RUST FROM KNIVES, Etc.—To remove.—Cover the knives with sweet oil, well rubbed on, and after two days, take a lump of fresh lime and rub till all the rust disappears It forms a sort of soap with the oil, which carries off all the rust.

RUGS, SHEEPSKINS OR MATS—To clean.—Make a very strong lather, by boiling soap in a little water; mix this with a sufficient quantity of water (rather more than luke-warm) to wash the mat or rug in, and rub boiled soap on those portions of it which require additional cleansing. When the mat has been well washed in this water, prepare another lather in the same way, in which a second washing must take place, followed by a third, which ought to be sufficient to cleanse it thoroughly. Rinse it well in cold water till all the soap is removed, and then put it in water in which a little blue has been mixed, sufficient to keep the wool of a good white, and prevent its inclining to yellow. After this it should be thoroughly wrung, shaken, and hung out in the open air, with the skin part towards sun, but not while it is scorching, otherwise the skin will become hard. It must also be shaken often while drying, for if not, it will be quite stiff and crackly. It should be frequently turned, being hung up first by one end and then by the other, until it has dried entirely.

SASH WINDOWS—To keep up.—This is performed by means of a cork, in the simplest manner, and with scarcely any expense. Bore three or four holes in the sides of the sash, into which insert common bottle-corks, projecting about the sixteenth part of an inch. These will press against the

window frames along the groove, and by their elasticity support the sash at any height which may be required.

SILK—To WASH.—Spread it on a table, and then rub it with a sponge dipped in a mixture of equal parts of soft soap, brandy, and cane molasses. Rinse it thoroughly in three successive portions of water, and iron before quite dry.

SHIRT BOSOMS AND COLLARS—To STARCH.—Pour a pint of boiling water upon two ounces of gum-arabic, cover it and let it stand over night; in the morning pour it carefully from the dregs into a clean bottle, cork it and keep it for use. A tablespoonful of this gum-arabic water, stirred into a pint of starch made in the usual manner, will give to lawns, either white or printed, a look of newness when nothing else can restore them after they have been washed. To every pint of starch add a piece of butter, lard, tallow or spermaceti candle the size of a chestnut.

SHOE SOLES—To SAVE.—It consists merely in melting together tallow and common resin, in the proportion of two parts of the former to one of the latter, and applying the preparation hot, to the soles of the boots or shoes—as much of it as the leather will absorb.

SOOT IN CHIMNEYS, by taking fire, and dropping burning cinders on dry shingle roofs, causes many conflagrations. Most fires in the country originate in this way. Be particular to clean or burn out soot at least once a year, when the roof is wet.

SHOES, PEGGED, made of light or thin material, often have the soles crack off at the concave part before the shoes are half worn out. This is owing to the pegs becoming dry and shrinking. To prevent it, avoid thrusting them against stoves, or standing on hot-air registers; at the same time keep them somewhat moist, by occasionally walking on wet ground. If this is not a sufficient remedy, drive a few copper tacks at the place of the pegs and clinch them inside. They may be bought at hardware stores, and kept for this use; a half dozen will do for each shoe.

SOAPSUDS—CLEARING.—It is generally known that a little dissolved alum is very effective in clearing muddy water; but recent experiments show its further virtues. In a place where water was scarce, a little alum was dissolved in hot water, and thrown into a tub of thick soapsuds. In a short time the soap curdled, and accompanied by the muddy particles, sank to the bottom, leaving the water above perfectly clear, pure, and devoid of smell. This water was found very useful for washing clothing, when poured off the sediment. A similar result was attained in a quick manner by filling a boiler with soapsuds, placing it on a fire, and throwing a bit of alum into it. When the suds boiled, the scum went over, and left the water clear, soft, and as useful for washing clothes as it had originally been.

SPOON — SELF-HOLDER FOR A.—When temporarily filled with any liquid, or for dropping medicine, may be made in the simplest manner possible, by thrusting the handle between the leaves of a shut book lying on the table. If not high enough, one book may be piled upon another. Both hands may then be used in dropping from a bottle or making any desired mixture.

SHIRT-BOSOMS—TO POLISH.—Put a little common white wax in your starch, say two ounces to the pound; then if you use any thin patent starch, be sure you use it warm, otherwise the wax will get cold and gritty, and spot your linen, giving it the appearance of being stained with grease. It is different with collar starch—it can be used quite cold; however, of that anon. Now, then, about polishing shirts: starch the fronts and wristbands as stiff as you can. Always starch twice, that is, starch and dry, then starch again. Iron your shirt in the usual way, making the linen nice and firm, but without any attempt at a good finish; don't lift the plaits; your shirt is now ready for polishing, but you ought to have a board the same size as a common shirt board, made of hard wood, and covered with only one ply of plain cotton cloth. Put this board into the breast of your shirt, damp the front very lightly with a wet sponge, then take a polishing iron, which is flat and beveled a little at one end, polish gently with the beveled part, taking care not to drive the linen up into wave-like blisters; of course this requires a little practice, but if you are careful and persevere, in a short time you will be able to give that enamel-like finish which seems to be so much wanted.

SHIRT-COLLARS—TO DRESS.—For this purpose use the best starch, say two pounds, and four ounces of wax and six and a half pints of water; first dissolve the wax in the boiling water, take the vessel off the fire and allow it to stand for five minutes; during this time dissolve the starch in the smallest possible quantity of cold water, then pour it gradually into the vessel and boil for twenty-five minutes—keep stirring all the time; this starch can be used quite cold; rub it well into the collars, wring as tight as you can, finish by wringing in a cloth, then iron; thus you will have them stiff without being hard, and when well dressed will have that beautiful elastic finish so much admired in new collars.

SOAP—LABOR-SAVING.—To make it, take two pounds of sal soda, two pounds of yellow bar-soap, ten quarts of water, or in like proportion. Cut the soap into thin slices, and boil altogether two hours, and then strain through a cloth into a tight box or tub; let it cool and it is fit for use. Do not let it freeze. To use it, put the clothes in soak the night before you wash. The next morning put your water into your kettle or boiler. To every two pails of water, add about one pound of the soap. As soon as

the water, with its dissolved soap begins to boil, wring out the clothes from the water in which they had been at soak during the night, and put them into the boiling water, without any rubbing. Let them boil one hour, then suds and rinse them, and they will be clean and white. They will need no rubbing, except a little on such places as are soiled, and for that no wash-board will be required. The clothes should be rinsed in two waters.

Colored and woolen clothes must not be boiled as above, but may be washed in the suds weakened with water. The clothes will last longer by the use of this soap, and much labor will be saved. Six pounds of sal soda, six pounds of bar soap, and thirty quarts of water, will make about fifty pounds of the soap. The soda costs about eight cents a pound, and the bar soap eight cents a pound. A pint measure will hold a pound of the labor-saving soap. This will save the trouble of weighing every time.

SOAP MAKING.—The best process of making soap is simply this: First, procure good ashes; place half a peck of caustic or water-slacked lime in the bottom of the leach, for each barrel of ashes; if air-slacked, the quantity must be larger, according to the time it has been exposed to the air. It is usual to place straw before the lime, to prevent the water from carrying it off in particles. Place the ashes on the lime, beating it compactly as each successive layer is applied, till the leach is full. If not beaten solid, the water will run through too soon, and the lye will be weak.

A stout barrel, slightly inclined, with a hole bored through the bottom, makes a good leach. It should be placed on a piece of broad plank, with a gutter cut around it, to collect the lye, and high enough from the ground to set a tub under. The water poured upon the ashes should be hot, until the lye begins to run, and the time that should elapse after the water is first applied till it passes through as lye, should not be less than twenty-four hours; if sooner, the ashes have not been beaten sufficiently and the lye will be too weak. It will continue to run as long as water is applied, but at the same time growing weaker, as the potash is carried off.

If the ashes could be perfectly fresh, no lime would be required in the leach, as when first burned, ashes are caustic, but gradually lose this quality by absorbing carbonic acid from the air. The lime abstracts this carbonic acid and renders the lye again caustic.

If lye is not strong enough to float an egg, it will not make good soap—but we have known it to do this, and still cause a failure, if not sufficiently caustic. The last named defect may generally be ascertained by pouring in a portion of some strong acid, as aquefortis or oil of vitriol, which will cause a violent effervescence—even strong vinegar will do. When this is the case, it shows that enough lime has not been used; and it may still do

to apply it. We have known its use to cause success even after the materials for the soap had been mixed together.

The grease must be *first foiled*—then a pint of lye added—afterwards a quart of soap, and so on by gradual additions until the soap is made. A barrel of good ashes will make a barrel of soap, but if the lye is strong enough to combine well with the grease, the soap will be too strong, and injures the clothes. This is remedied by adding a pail of water to each pail of freshly made soap, or diluting it.

STAINS—Iron.—These come from iron-rust, ink, etc. To remove them the iron is first dissolved by a solution of oxalic acid in water. The oxalate of iron thus produced, which, unlike iron rust, is soluble, is readily removed by washing or soaking. Ink spots (tanno-gallate of iron) upon the printed leaves of books, are removed in the same way—but the lamp-black of the printer's ink is not at all affected. If fresh, such spots may be wholly effaced; if old and dry, a very little will remain. Wheel grease makes a compound stain of grease and iron. The grease may be taken out first by alkali; then the iron by oxalic acid. If tar has been used on the wheel, rub on lard, which will dissolve it, and then apply the alkali. Turpentine will answer nearly the same purposes as lard.

STAINS—Vegetable.—These include fruit stains, and may be removed with chlorine or sulphurous acid. A diluted solution of chlorine will remove them; or if practicable, chlorine in a gaseous state will be better, the place being wet. Sulphurous acid, or the strong fumes of burning sulphur, will effect the same purpose, but much more slowly, and perhaps more safely. Both these substances will, however, remove any other vegetable color which may have been used for dyeing the fabric. To remove stains from calico or other colored substances, without affecting the original hue, requires not only a knowledge of the materials used in dyeing, but of those which will dispel the stain without affecting these dyes, and would be too extended a subject for our present limits.

STAINS—Removing.—Receipt books give an almost endless number of directions, without the reasons, in the form of a vast undigested mass of remedies. A knowledge of the substances, and the application of chemical principles, greatly simplifies the act, and renders intelligible and certain what before was only accomplished guess-work and endless trials.

STAINS—Grease.—These are from grease, oil, etc., and are simply removed by alkalies or soap, or by essential oil dissolved in alcohol. Alkalies, such as solutions of saleratus or liquid ammonia, will remove them safely from all substances without color. For other substances, the alcoholic solutions spoken of will do, and among them burning fluid answers a good purpose. But the best of all is the new preparation termed Benzine,

which exceeds anything else we know of in efficiency. Lay a paper under the fabric and apply the liquid. Oil spots and stains from candle snuff, on woolen table covers, paint spots on garments, etc., are thus perfectly removed, without the slightest discoloration.

STAINS—Acid.—These may generally be known by reddening black, brown and violet dyes, and all blue colors except Prussian blue and indigo. Yellow colors are generally rendered paler, except the color of annato, which becomes orange. These stains are neutralized by alkalies. A spot, for instance, on a woolen coat, from strong vinegar, or sulphuric acid, may be entirely removed by applying a solution of saleratus. Apply it cautiously until the acid is exactly neutralized, which may be known by the restoration of color; and then sponge off the salt thus made by means of a sponge. Ammonia is better for delicate fabrics

STAINS—Sweat.—Are chiefly occasioned by a little muriate of soda and acetic acid—which produce nearly the same effects as acids generally, and are to be removed in the same way, operating cautiously.

STAINS—Alkaline.—These are the opposite of acid stains—they change vegetable blues to green, red to violet, green to yellow, yellow to brown, and annato to red. They are to be treated with acids. The writer once had a new pair of dark cloth pantaloons changed to a light brown below the knees, by riding on a load of fresh lime in a storm. "Oh! you have ruined your clothes!" was the exclamation; but he deliberately procured a cup of vinegar, and sponging the cloth gradually, completely restored the color, and then again sponging off the compound, left them as good as before.

STAIR CARPETS may be preserved a much longer time by placing strips of paper nearly as wide as the carpet and five or six inches broad over the edge of each stair, which prevents the wearing at that place.

STARCH—Alum in.—For starching muslins, ginghams and calicoes, dissolve a piece of alum the size of a shellbark, for every pint of starch, and add to it. By so doing, colors will keep bright for a long time, which is very desirable when dresses must be often washed, and the cost is but a trifle.

STARCHING—Clear.—This is practiced as follows: Rinse the articles in three waters, dry them, and dip them in a thick starch, previously strained through muslin; squeeze them, shake them gently, and again hang them up to dry; and when dry, dip them twice or thrice in clear water, squeeze them, spread them on a linen cloth, roll them up in it, and let them lie an hour before ironing them. Muslins will look well when starched and clapped dry, while the starch is hot, then folded in a damp cloth till they become quite damp before ironing them. If muslins are sprinkled

they are apt to be spotted. Some ladies clap muslins, then dry them, and afterward sprinkle them.

STOVES—To POLISH.—For a stove of medium size, pulverize a piece of alum the size of a large hickory-nut, stir into two table-spoonfuls of vinegar, add this to the stove-blacking, mixed with water in the usual manner. Apply this mixture with a cloth or brush to a cold stove, and while wet rub briskly with a dry brush. The polish will appear at once.

TEA-KETTLE—To PREVENT CRUST.—Put into the kettle a flat oyster-shell. It will attract the stony particles that are in the water to itself, and prevent their forming upon the kettle.

TIN COVERS—To CLEAN.—Boil rotten-stone and a small quantity of prepared whiting in sweet oil for two hours, until it acquires the consistency of cream.

TINWARE—To CLEAN.—The best thing for cleaning tinware is common soda. Dampen a cloth and dip in soda, and rub the ware briskly, after which wipe dry. Any blackened or dirty ware can be made to look as well as new.

TIN PANS—To MEND.—Put putty on the outside; let it dry well, and the pan will never need mending in the same place again.

TALLOW—To BLEACH AND HARDEN.—In a copper boiler put one-half gallon water and one hundred pounds rendered tallow; melt over a slow fire, and add, while stirring, one pound of oil of vitriol, previously diluted with twelve of water; afterwards, half pound bichromate of potassa, in powder; and lastly, thirteen pints water, after which the fire is suffered to go down, when the tallow will collect on the surface of the dark green liquid, from which it is separated. It is then of a fine white, slightly greenish color, and possesses a considerable degree of hardness.

TWINE WASTE should be neatly wound into a ball, and kept for future use, and not thrown into drawers in a tangled mass. This will save time when one is in a hurry, and imparts habits of neatness.

VINEGAR—To PREVENT "MOTHER" IN.—Add a few drops of sulphuric acid to each gallon of vinegar, and it will thoroughly arrest further vegetation of this kind.

WALL PAPER may be thoroughly cleaned by rubbing it with dry Indian meal on a cloth. Pieces of bread are commonly used for this purpose, but the Indian meal is obviously cheaper and easier.

WASHING FLUID.—We have lately tried a washing fluid which has proved very successful in extracting the dirt from cotton and linen, and the proportions are such that they cannot injure the clothes: Five pounds of sal-soda; one pound of borax; half a pound of fresh unslacked lime; four ounces salts of tartar; three ounces liquid ammonia.

Dissolve the soda and borax in one gallon of boiling water; when well mixed, pour in the liquid ammonia and salts of tartar. Boil the half pound of lime for five minutes in one gallon of water; set it aside to settle, and when clear pour it off carefully, not allowing any sediment to mingle with it. Pour the two gallons of solution together, and turn upon them eight gallons of cold water. Put into a cask or jugs.

The night before washing, take six tablespoonfuls to a tub filled with clothes, mixing it with four pails of warm water. Soak them over night; next morning add hot water enough to wash the clothes with good soap-suds. Boil the clothes. Wash out another tub full of clothes in the same water used for the first boiler.

One trial of this fluid will show its good effects.

An excellent soft soap can be manufactured from this compound. Take one quart of the fluid; slice into it three pounds of yellow bar soap, and add to it two pounds of sal-soda. Boil it in three gallons of water for ten minutes, and it will make four gallons of soft soap which will prove unequaled for all purposes wherein soap is needed.

In using these recipes for washing, the clothes do not need to boil more than half an hour, and in many cases persons prefer to pour boiling water upon them, and let them stand until it is cool enough to wring out. By thus doing it is thought the clothes are whiter.

These recipes have been sold through the country at high prices, and a good deal of money has been made from their manufacture.

WASHING CLOTHES.—Never put off washing on account of rain; it may be no drier any other day of the week.

A good washing machine will save much labor and wear of fabrics. The only requisite to complete success in working it is to use *boiling* water. A good wringer saves not only time and strength, but many dollars in the wear of clothing, which is always injured by the straining and twisting of wringing by hand.

Don't wash calicoes with soft soap, and never dry them out of doors; they will surely fade. Their colors may be set by washing once in soft water, in which beef's gall has been diluted in the proportion of one table-spoonful of gall to one gallon of water.

Many thousands of dollars are wasted by the careless washing of flannels. The following recipe, furnished by an experienced housekeeper, will infallibly prevent them from shrinking: Make suds of hard soap and *boiling* water; lay in the flannels and leave them in it till the water is cool enough for the hands to bear. Then rub the flannels on a wash-board till clean; wring them out, and throw them into a tub of *boiling* water; let them lie till the water is cool enough for the hands, then rinse them in it thoroughly and

wring them out. Repeat the rinsing process with another tub of boiling water, then hang them up to dry. Never rub soap on flannels. Never wash colored and white together; hang the former in the shade, the latter in the sunshine.

Do not use those clothes-pins that are made in the form of pincers, with a spring to shut the ends together. They hold too tightly, and cut holes in the clothes.

A simple article, called the clothes sprinkler, has been found by long trial to dampen the clothes more evenly, and keep the hands dry besides. It consists of a hollow tin cylinder, about four inches long and three in diameter, closed at both ends, but having one of them pierced like the rose of a watering-pot. A tube inserted in one side admits the water into the cylinder, and forms a handle to hold while sprinkling. After filling the sprinkler, cork up the tube and shake the water over the clothes.

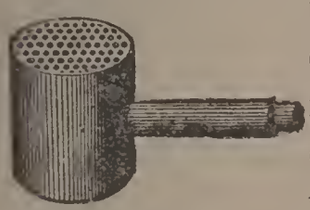


Fig. 203.
Clothes Sprinkler.

WASHING—Hints on.—The linen for Monday's wash should be collected on Saturday, sorted and put to soak in cold water, according to the various kinds. The body linen should be put into one tub, the bed and table linen in another, and the fine things separately. Plain collars, cuffs, wristbands, should be strung through the button holes on a piece of bobbin long enough to enable the articles to be easily divided for rubbing, starching, etc. Colored muslins, prints, and flannels must be laid aside to be washed in a different manner from white calico or linen. Properly boiled suds are far better than soap for washing, particularly if a washing machine be employed. The suds should be prepared in the following manner: Shred into an earthenware jar the best yellow soap cut into very fine shavings, and pour boiling water to the quantity required. One pound of soap is plenty for one gallon of water. Add to this quantity half a pound of the best soda, and set the jar (covered) on a stove or at the back of the kitchen range till the soap is quite dissolved. If this be done on Saturday evening, the soap will be a smooth jelly fit to use on Monday morning.

WASHING FLUID.—1. Take one pound of sal soda and half a pound of unslacked lime, put them into a gallon of water and boil twenty minutes; let it stand till cool, then drain off and put into a strong jar or jug; soak your dirty clothes over night, or until they are wet through, then wring them out and rub on plenty of soap, and in one boiler of clothes, well covered with water, add one teacupful of washing fluid; boil half an hour briskly, and then wash them thoroughly through one suds, rinse, and your clothes will look better than the old way of washing twice before boiling.

2. Five pounds of sal soda, one pound of borax, one pound of unslacked lime. Dissolve the soda and borax in one gallon of boiling water; slack the lime in the same quantity of boiling water; then pour them both into eight gallons of cold water; stir a few times and let it stand till morning, when the clear fluid should be poured off into jars, ready for use. For two pails of water use half a pint of the compound. Soak your clothes over night, putting soap on the soiled parts. In the morning wring them out and put them on to boil, first putting some of the fluid and soap into the boiler. After boiling ten or twelve minutes, take them out into your machine or tub and the dirt will rub right off; then rinse well in two waters.

3. One and one-quarter pounds of washing soda, $\frac{1}{4}$ pound borax, and dissolve in 4 quarts water by boiling. When the mixture is cold add about one half a teacupful of water of ammonia (hartshorn), and bottle for use, taking care to keep the fluid corked from the air. For use take a cupful to a pailful of water.

4. Sal soda and borax, $\frac{1}{4}$ pound each; gum camphor, 1 ounce; alcohol, $\frac{1}{2}$ pint. Dissolve the soda and borax in one gallon of boiling rain water, pour in two gallons of cold rain water, add the camphor first dissolved in the alcohol, stir well and bottle for use. Four tablespoonsful of the preparation are to be mixed with a pint of soft soap, and the clothes boiled in a suds made of this. It is all the better if the clothes are soaked over night, before putting them into the suds.

Soak your clothes over night in clear, cold water; in the morning have over the fire what water is necessary to boil them in, add one tablespoonful of saleratus, one pint of soft soap, or one quarter of a bar of hard soap, wring or drain your clothes from the water in which they have stood over night, put them in your boiler, boil three quarters of an hour, when they will need but little rubbing, rinse, and your clothes will be beautifully white.

Your suds will be excellent for washing colored clothing of all kinds, as it does not injure the nicest prints. One pound of saleratus will do twenty washings for any common family.

WATCH—To WIND.—Turn the hole downward, and let the point of the key point upward. This will allow any little particles of metal or dust to drop out, and the watch will not need cleaning so often.

WATER—BAD IN NEW WELLS.—Water otherwise good, is sometimes made bad in new wells by dissolving impurities from the stones used to wall them. We knew a case of this kind, where in a few weeks the water became so fœtid that no animal, however thirsty, would touch it. The cause was suspected and the well cleaned; the second filling of water was much better; the process was repeated, and after the water was drawn out the third time it became perfectly good. It has since, for many years, been noted for its excellent water.

WEEKLY EXAMINATIONS.—See that beef and pork are under brine; count towels, sheets, spoons, etc.; examine preserves and see they do not become mouldy; mend all garments; see that vegetables in the cellar are not sprouting and becoming mouldy; count clothes-pins; stir Indian meal to prevent fermentation.

WHITEWASHED WALLS—To prepare for painting.—If there should be any cracks in the plastering, and the wash be sound around the cracks, plaster-of-paris is the best thing to fill them with, as it hardens quickly, does not shrink, and leaves the surface level with the wall. If the plaster-of-paris sets before it can be worked, wet it with vinegar. The stronger the acid the slower it will set. If cracks be filled with putty, and the wall be painted in gloss color, the streaks of putty are apt to flat (no gloss,) and if painted in flat color, the streaks are quite sure to have a gloss. These streaks, of course, will spoil the beauty of the work, but do not affect its durability. When filled with plaster-of-paris the reversion of gloss never appears, if done as directed below. If the cracks be only in the wash, the latter is loosening from the wall; and if it has not begun to scale, it soon will, and all attempts to fasten it on and paint will be total loss. If it be loose enough to scrape off, scrape the wall, taking care not to gouge into the original wall. If not loose enough, let it alone until it is. If the wash be thin, solid, and even, it can be painted to look and wear well. When the surface is lumpy, rub the lumps off with sand-stone, or a brick. After a wall has been prepared, as in either of the above cases, or if a wall that has never been washed is to be painted, size it with two coats of glue size (three ounces of glue to one gallon of water.) Be sure the glue is all dissolved before using any of it. Let the first coat dry before the second coat is put on.

WINDS—Cold, avoiding.—Those who have to ride in cold winds in winter, and who do not happen to have sufficient clothing at the time, may protect the lungs or chest by placing a doubled newspaper in front, and then buttoning the coat over it. It will be found to have a remarkable protecting power against the cold. Those who do not happen to have sufficient bedding, and who take some one of the great blankets called fashionable newspapers, may protect themselves on very cold nights, by spreading one or more between the quilts. Travelers should take a few with them for this purpose.

WORKING DRESS.—It is desirable while performing domestic labor to adopt such a style of dress as will be convenient to work in, without being so peculiar as to attract attention. A plain calico dress, somewhat shorter than for parlor wear, but long enough to reach at least the tops of the shoes, is most convenient in all respects. But a large apron, made with high neck,

full waist, belt, long sleeves and long, full skirt, is exceedingly valuable to slip over a nice new dress when doing housework, washing supper-dishes, etc. It should be made quite loose, and of a material that will wash. Fasten up your dress-skirt with a "page," put on the apron, and you may go to work without danger of spoiling your clothes.

Curing and Storing.

APPLES—Keeping.—S. S. Boyd, of Jacksonburgh, Indiana, states that he has found apples to decay in keeping, more from being kept too close and warm, than from all other causes put together. He has succeeded remarkably with a cellar where the air circulates freely, and is so cool that potatoes cannot be kept there. Close or confined air we have long since found to be detrimental, and we have therefore adopted the plan of suspending the apple shelves in the middle of the cellar, so that one can pass round on every side, which is the most convenient; and so as to admit a free circulation of air, which cannot take place when the shelves are in contact with the damp walls. Iron rods are best for supporting them, and if sufficient space is allowed, rats and mice cannot reach them.

BACON—How to keep.—We give the following different modes for keeping hams, either of which may be employed according to circumstances, or the facilities possessed or at hand:

1st. Mix equal parts of slacked lime and wood ashes; spread three inches of the mixture on the bottom of a box, then a layer of bacon; cover with lime and ashes, lay a few laths on, then a layer of bacon, and continue until the boxes are full. Set in a dry, cool place. All ashes answer if no lime is near by. For a few pieces for a family, cover each piece of bacon or ham with paper, and pack in a salt barrel, with ashes between each piece, and fill the barrel up with ashes. The meat will be as good at the end of the year as when put in.

2d. Do not pack it down in anything, but take each piece and hang it in a loose bag, stuff the bag tight with cut hay, and your hams will keep sound and fresh for an indefinite time.

3d. Pack your hams, shoulders and dried beef in barrels, and cover them with powdered charcoal, and the meat will keep sweet and will not be touched by flies, mice or rats.

4th. Malt screenings will keep bacon better than bran.

5th. Nice sweet timothy hay, cut fine, is the best thing extant for packing bacon, as it imparts a pleasant aromatic taste to the meat. Bran will sour and spoil the bacon.

BEEF--KEEPING FRESH.—Combe says the ribs will keep longest, or five or six days in summer, the middle of the loins next, the rump next, the round next, and the brisket the worst. which will not keep longer than three days in summer.

BEEF, CORN—HOW TO.—Add two pounds brown sugar to eight gallons water, also one quart molasses, four ounces of nitre, and fine salt till it will float an egg. This is enough for two quarters of beef.

BEEF—CURING.—By most of the modes now in use, the beef becomes too much impregnated with salt, and is not as a consequence so fine for eating. By the following process this difficulty is prevented, and the beef will keep till the following summer: To 8 gallons of water add 2 pounds of brown sugar, 1 quart of molasses, 4 ounces of nitre, and fine salt till it will float an egg. This is enough for two common quarters of beef. It has been repeatedly tried and found very fine; a famous beef eater says it is the only good way.

BIRDS—TO PRESERVE.—Birds may be preserved in a fresh state for some time by removing the intestines, wiping the inside out quite dry with a towel, and then flouring them. A piece of blotting paper, on which one or two drops of creosote have been placed, is now to be put inside them, and a similarly prepared piece of paper tied round them. They should then be hung up in a cool place, and will be found to keep much longer than without undergoing this process.

CABBAGES—PRESERVING.—There are several good ways of keeping cabbages during the winter by burying them out of doors. The difficulty is, it is hard to get at them during winter, without damage to those left. The following plan appears to avoid this difficulty: Cut the head from the stump, and pack closely in a cask, taking care to fill up all the vacancies with chaff or bran, and keep in a dry cellar.

CHERRIES—DRIED.—Take the stems and stones from ripe cherries; spread them on flat dishes, and dry them in the hot sun or warm oven; pour whatever juice may have run from them, a little at a time, over them; stir them about, that they may dry evenly. When they are perfectly dry, line boxes or jars with white paper, and pack them close in layers; strew a little brown sugar, and fold the paper over, and keep them in a dry place; or put them in muslin bags, and hang them in an airy place.

CIDER—HOW TO KEEP SWEET.—Use only sound apples. Make the cider when the weather is almost cold enough to freeze the apples. Expose the cider during freezing weather, and stir it until the whole of it is reduced as near the freezing point as possible without freezing. Then barrel it, bung up tight, and place it in a cellar kept nearly down to the freezing point. As long as you can keep it cold enough it will not ferment, and as long as it does not ferment it will remain sweet.

CLOTHES-PINS—To preserve.—Clothes-pins boiled a few moments and quickly dried, once or twice a month, become more flexible and durable. Clothes-lines will last longer and keep in better order if occasionally treated in the same way.

COFFEE—How to grind.—A London paper says that the Germans have lately found that it is not economical to use coffee ground so coarse as is common; if ground fine, one-half the quantity will make equally good coffee; and if pounded in a mortar till reduced to an impalpable powder like flour, as practiced in Turkey and other Eastern countries, still less, only two-fifths, is needed. Further experiments went to show that the result was the same whether the beverage be prepared by simply pouring boiling water over the coffee and letting it stand a time short to draw like tea, or if the infusion be allowed to boil up once or twice, or the coffee simply filtrated. But it was abundantly proved that by the last-named mode of proceeding, though the strength of the coffee remained the same, the aroma was preserved to a much greater extent than by either of the other methods.

On the other hand, the *Food Journal*, which is unexceptional authority in all culinary matters, says that if coffee be ground very fine, there is a decided loss of aroma in the infusion. It commends the coffee prepared by the French Coffee Company for the coarseness of the grinding.

If the coffee is kept for any length of time after being ground, we are inclined to think that this latter view is correct; but if ground at home just before being used, we should rather side with the Germans.

CORN—Canning.—Shave the corn from the cob, fill tin cans as full as you can with corn, then pour in cold water until even full, make a small hole in the cover and solder on the cover, place the cans in a boiler with cold water about half the height of the can, place the boiler on the stove, let them boil four hours, then remove them from the boiler, and drop a little solder on the hole in the cover. Corn canned in this way at the end of the year will be as white and tender as when picked.

CORN, GREEN—Preserving for winter use.—Cut the corn off the cob, and put it in a stone jar, with a handful of salt to a pint of corn. When the jar is full, put a weight on it. When you wish to use it, remove a little of the top, and wash and soak over night.

BUTTER—Tainted, restoring.—Cut or break the butter into grains or very small pieces, by passing it through a coarse sive or otherwise. Put it into the churn with a sufficient quantity of new milk to float it and churn it well, which will free it from the bad taste, when it may be taken out and worked and salted, as new butter.

CRANBERRIES—To keep.—Cranberries will keep all winter in a firkin of water in a cellar.

CUCUMBER PICKLES.—Cut the cucumbers from the vine by means of scissors or a knife, so as not to tear the end, as would be the case if merely plucked by hand. Wash them in cold water, and then lay them in the bottom of a barrel or jar, into which a layer of salt has been previously deposited, so that when successive layers of cucumbers and salt are made, the former will be imbedded in salt, the moisture which covers them tending to dissolve the salt and convert it to brine. They may remain a long time in this condition—many keep them thus until sold in market. To finish the pickling process, take a quantity of good vinegar, but not too sharp or it will destroy the texture of the cucumbers, and give it the flavor of spices, by placing equal quantities of cloves, red and black pepper, in a bag so as to give about half a teacupful of this mixture to a gallon of vinegar, both to be boiled together. Then, having previously removed the pickles from the salt, and soaked them about eight or nine days in fresh water, changing the water each day; pour the hot vinegar, spices, pepper, bag and all, over the cucumbers, and in two weeks they will be ready for use. Some who make very sharp pickles pour off the first vinegar, and make a second addition, keeping the first liquor for the next batch.

Another recipe is as follows:

Cut the cucumbers from the vines, wash them in cold water, and place them in an earthern jar. Put salt enough to make a strong brine into boiling water and pour on them; repeat three successive mornings, and on the fourth cover them with cold vinegar, adding a small quantity of mustard seed to prevent moulding. They will keep the whole year.

CURRANTS—Drying and preserving in bunches.—Beat well up the whites of eggs, or a little gum-arabic dissolved in water; and, after dipping in the bunches, and letting them get a little dry, roll them in finely-powdered loaf-sugar. Lay them on a sieve in a stove to dry, and keep turning them and adding sugar till they become perfectly dried. Not only red, white and black currants, but even grapes in bunches may be thus dried and preserved. They should be carefully kept dry, in boxes neatly lined with paper.

CURRANT JELLY.—The following method of making currant jelly, which we have practiced for more than twenty years, will be found to save trouble, and afford a good article. For straining the jelly two pieces of board, shaped to form handles on one end, and hinged together with leather at the opposite end, form a good squeezer, saving the hands from burning. Put the currants (with the stems on) in stone jars and cover them. No leaves must be put in, for they are bitter Set the jars in warm, but not hot, water over the fire. When the water boils, and the currants are warm and somewhat sunk in the jars, strain through a linen or flannel bag.

To every pint of juice allow one pound of loaf sugar. The sugar is not to be cooked at all. Put it in a clean milk pail. Put the juice into a brass or porcelain kettle; boil it about five minutes (not longer;) pour it boiling hot upon the sugar, and stir it till all the sugar is dissolved. Then put it in bowls, glasses or jelly moulds. Paste on white paper covers. It will be thick in a few days.

DRYING HOUSE—FRUIT.—Several portable fruit drying houses have been patented and constructed, one of which is represented in the annexed engraving The others are made on the same principles, and are similar in form. They are about three feet square and four feet high, but may vary according to convenience. The fruit when the fire is made, is covered with sheet iron to prevent danger from taking fire. The fruit is placed on shelves, and is thoroughly dried in a few hours, whether the weather be rainy or not. They are easily moved to any part of the orchard. Any one can make a portable house for this purpose, by making a small, light board house, furnished with sliding sieves as shelves, a ventilator at the top, a small stove with pipe passing around near the bottom, and double doors for access.

Fig. 204.

EGGS—PICKLED.—The jar to be of moderate size—wide-mouthed earthern jar, sufficient to hold one dozen eggs; let the latter be boiled quite hard; when fully done, place the same, after taking them up, in a pan of cold water. Remove the shells from them and deposit them carefully in the jar. Have on the fire a quart or more of good white wine vinegar, into which put one ounce of raw ginger, two or three blades of sweet mace, one ounce of allspice, half an ounce of whole black pepper and salt, half an ounce of mustard seed, with four cloves of garlic. When it has simmered down, take it up and pour the contents into the jar, taking care to observe that the eggs are wholly covered. When quite cold, stopper it down for use. It will be ready after a month. When cut into quarters, they serve as a garnish, and afford a nice relish to cold meat of any kind.

EGGS—TO KEEP.—*a*. Parties in the egg business in a large way build brick vats made water-tight, in which is lime-water, which is made by putting lime in water, and when it is slacked and settled to the bottom drawing off the liquor. Into this liquor the eggs are placed and kept beneath the surface. They are kept as cool as possible. These are the limed eggs with which the markets are supplied during winter.

b. Another mode of keeping eggs, tested by the Agricultural Department, is as follows: Rub the eggs with flaxseed (linseed) oil, and place them,

small end downwards, in sand. Eggs so prepared were found at the end of six months to have the same taste and smell of perfectly fresh eggs, and to have lost in weight only three per cent. Greasing eggs with lard or tallow has not been successful in preserving them, except for short periods.

c. Take a thin board of any convenient length and width and pierce it full of holes (each one and a half inches in diameter) as you can. A board two feet and six inches in length and one foot wide, has five dozen holes in in it, say twelve rows of five each. Then take four strips two inches broad, and nail them together edgewise into a rectangular frame of the same size as your other board. Nail this board upon a frame, and the work is done, unless you choose to nail a heading around the top. Put your eggs in this board as they come from the poultry house, the small ends down, and they will keep good for six months, if you take the following precautions: Take care that the eggs do not get wet, either in the nest or afterwards. Keep them in a cool room in summer, and out of the reach of frost in winter. If two boards be kept, one can be filling while the other is emptying.

d. Eggs can easily be kept from October to March in the following manner: A piece of lime as large as a quart dipper, is put in five gallons of water, and salt added until an egg will float. This is strained and put into a clean keg, into which a loose head is made to fit easily; a knob is fitted to the head for a handle. The eggs are put, as they are gathered, into the liquid, and the loose head placed on them to keep them below the surface. The keg should be kept in a cool place in the cellar. The liquor will not freeze except at a lower temperature than freezing point. Eggs thus preserved will sell readily as limed eggs until fresh eggs come, and are almost as good as fresh ones.

e. Take one quart of unslacked lime, pour to it water enough to make it the consistency of whitewash, add one teaspoon of cream tartar; let this be in a wooden or stone vessel, and put the eggs into it.

f. Hang them by hooks in strong cabbage-nets, and every day hook them on a fresh mesh, so as thereby to turn the eggs.

g. Apply with a brush a solution of gum arabic to the shells, or immerse the eggs therein, let them dry, and afterwards pack them in dry charcoal-dust. This prevents their being affected by alterations of temperature.

h. Mix together in a tub, or vessel, one bushel Winchester measure of quick-lime, thirty-two ounces of salt, eight ounces of cream tartar, with as much water as will reduce the composition to a sufficient consistency to float an egg. Then put and keep the eggs therein, which will preserve them perfectly sound for two years at least.

i. Eggs can be preserved by keeping them at a temperature of 40° or less in a refrigerator. Eggs have been tested when kept in this manner for two years, and found to be perfectly good.

j. Dissolve three or four ounces of bees-wax in seven ounces of warm olive oil; put in this the tip of your finger and anoint the egg all over. Keep the eggs in a cool place, and they will keep fresh for five years.

k. Keep your eggs buried in salt, or dip them in boiling water two or three times. The white portion of the egg by this dipping forms a kind of membrane, which envelops the interior and protects it from the air.

l. Secure a good, sweet wooden box; place on the bottom of the box about one and a quarter inches of common salt; then take sweet grease of any kind, lard or drippings, rub the eggs all over with it, and place them, the small end down, in the salt; then place another layer of salt and add more eggs.

m. Pack the eggs in a box of tallow, small end down. This is the Russian way of keeping eggs, and they keep fresh for years.

n. Rub the eggs carefully with mutton suet, or better, dip them in a bath made by melting suet in a pipkin. This stops the pores or perforations in the shell, and prevents the passage of the air. They should be afterwards wiped to remove the superfluous fat, which might become rancid. They should be then closely packed on end in a box of bran.

FRUIT IN CANS—Preserving.—To one pound of the fruit, put a quarter of a pound of loaf sugar. Put them over the fire together. Let them boil up once. Then have your cans in a pail of water as hot as possible without breaking them—have the cans also filled with water of the same warmth. Let them remain so a few moments. Then while the fruit and sugar are boiling hot, fill the cans while they are setting in the water. They must be filled to the very top. Then put the cover on, and seal with cement. After filling them, take them out of the pail of water, and put them away to cool. After they are cold turn them over on the other side, and let them remain so until you wish to use them.

FRUIT—Dried, to keep worms from.—Place your fruit in a steamer over a pot of boiling water, covered tightly. When thoroughly heated, tie them immediately in a clean linen or cotton bag, and hang them up. This method is preferable to heating in an oven, as that is apt to render them hard, even if you are so fortunate as not to burn them.

FRUITS—Keeping.—The following rules for keeping fruits are from the proceedings of the Royal Horticultural Society of England:

1. As the flavor of fruit is so easily affected by heterogeneous odors, it is highly desirable that the apple and pear rooms should be distinct.

2. The walls and the floor should be annually washed with a solution of quicklime.

3. The room should be perfectly dry, kept at as uniform a temperature as practicable, and be well ventilated, but there should not be a thorough draught.

4. The utmost care should be taken in gathering the fruit, which should be handled as little as possible.

5. For present use, the fruit should be well ripened; but if for long keeping, it is better, especially with pears, that it should not have arrived at complete maturity. This point, however, requires considerable judgment.

6. No imperfect fruit should be stored with that which is sound, and every more or less decayed specimen should be immediately removed.

7. If placed on shelves, the fruit should not lie more than two deep, and no straw should be used.

FRUIT DRYING.—One of the most complete fruit dryers is represented in the annexed engraving. It consists of a tall, upright shaft, *a*, *b*, represented in the section of the apparatus, through which passes an endless chain, made of a number of strong frames, securely hinged together at the corners. The chain should be a very strong one, as many times several hundred pounds will be on the shelves. The shelves should have nets or sieves thrown over them to keep off the flies. The engraving is so plain that any one can easily make one. Heated air from a stove and drum is made to pass up through the shaft *a*, *b*, being let in at the sides *b*, and confined to the shaft by the drum *e*. It is a very simple machine, and one that if made and operated, will repay the party a hundred times.

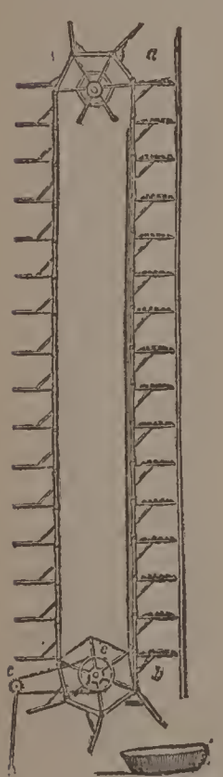


Fig. 205.--Fruit Dryer.

FRUIT—HOUSE TO DRY IN.—In many sections of the country the fruit crop is an important item; much of this fruit cannot be sent to market, to profit, in its green state, and may be dried to good advantage, and find a ready sale at high prices. At the Shaker establishments, in Kentucky, they have a method of drying fruit that is both expeditious and very complete. It consists of a building of logs, brick or stone, of any convenient size—say 10 feet wide by 12 or 14 feet long; the walls 7 or 8 feet high, with an ordinary roof. Upon the top of this should be a ventilator, sufficiently large to admit of the escape of the vapor arising from the fruit. An opening may be left along under the eaves for ventilating, but it is better to have it on the top of the building. At one end of the house a furnace is built, opening on the outside. This is about two feet square. The sides are of brick, and only sufficiently thick to sustain the top. The flue extends the length of the building, and returns to the chimney near the furnace door. The top of the furnace or flue may be covered with any old plates of cast-iron, or sheets of boiler iron; thicker iron, or a covering of brick or stone, might not admit of the escape of sufficient heat to dry the fruit with facility. The fruit is dried on trays or hurdles, arranged in three tiers, one above another,

with a space of twelve or fifteen inches between them. The hurdles are two feet or more wide, and six feet or more long, and three inches deep. These are simple trays made of pine boards, with bottoms made of small strips, or laths of hard wood. Through the length of the building, and extending six or eight feet outside, scantling are put up to support the three tiers of hurdles. A broad door is made at the end of the building to correspond with each tier of hurdles. Upon each pair of scantling a frame is made to correspond with the width, which runs out and into the building upon rollers, in the form of a railroad. The frames are drawn out through the end of the building and the trays of fruit placed on them crosswise, and then run in. Thus arranged, with the three tiers of rails filled with trays of fruit, about one and a half or two barrels of fruit can be dried at once, requiring twenty-four hours to complete the process. The trays nearest the fire, of course, will dry the fastest, and with the convenience of the railroad and the shutters in the end of the building, they may be drawn out and changed to the upper rails, when the whole may be equally dried within the twenty-four hours in the most perfect and uniform manner, without the least burning. The fire is made on the bottom of the furnace, which consumes less fuel, and keeps up a slow and more uniform heat than if placed above the draft.

In some instances I have seen old steam boilers, of small size, used for the furnace and flues, and these, where they can be obtained cheap, answer every purpose; these radiate the heat readily, and a small amount of fire answers the purpose.

There are many sections of the country where peaches and early apples cannot be readily sent to market, and as at this season of the year, when grass is abundant, they are of less value to feed swine, they may be dried in this way to good profit. In remote sections of the country fruit-growing may be made a source of considerable profit, in this way. The demand for dried fruit will always be greater than the supply.

GAME—To KEEP.—Newly ground coffee, sprinkled over game, will keep it sweet and fresh for several days. Clean the game; that is, wipe off the blood, cover the wounded parts with absorbent paper, wrap up the heads, and then sprinkle ground coffee over and amongst the feathers or fur, as the case may be; pack up carefully, and the game will be preserved fresh and sweet in the most unfavorable weather. Game sent open and loose, cannot of course, be treated in this manner; but all game packed i boxes or hampers may be deodorized as described. A tea-spoonful o. coffee is enough for a brace of birds; and in this proportion for more or for larger game.

GOOSEBERRIES—DRIED.—To seven pounds of red gooseberries add a pound and a half of powdered sugar, which must be stewed over them

in the preserving-pan; let them remain at a good heat over a slow fire till they begin to break; then remove them. Repeat this process for two or three days; then take the gooseberries from the syrup, and spread them out on sieves near the fire to dry. This syrup may be used for other preserves. When the gooseberries are quite dry, store them in tin boxes or layers of paper.

GRAPES—KEEPING.—A new method of keeping grapes in winter. has been adopted to some extent in France, consisting essentially in hanging up the bunches separately by the smaller end, on wire hooks. Small wires of sufficient stiffness, and a few inches in length, are bent into hooks in the shape of the letter S; one end is passed into the smaller end of the bunch, and the other placed upon a suspended hoop, as shown in fig. 206. The position of the bunches causes every berry to hang away from its neighbor, and consequently they are less liable to rot by contact, than any other arrangement.

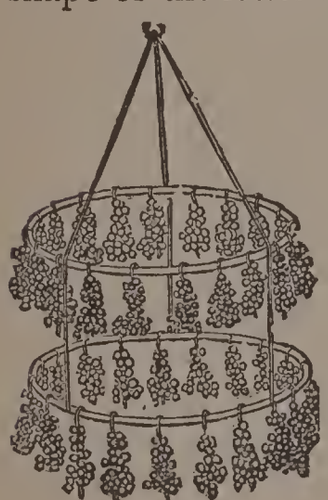


Fig. 206.

The hoops are suspended by three cords or wires to a button overhead, like the hook of a baby-jumper; and any convenient number of hoops may be hung successively under the first. The center of the fruit-room may thus be occupied; and the walls may be covered by passing horizontal wires around the walls and about a foot from them, to receive the hoops for the suspension of the, bunches.

This will be found much more perfect than the more common practice of keeping grapes upon shelves or in drawers. It is hardly requsite to remind those accustomed to the successful keeping of grapes, of the necessity of careful picking, the removal of imperfect or decayed berries, and of avoid- too much moisture in the fruit-room on the one hand, and of such a degree of dryness on the other as to cause wilting. The necessity of excluding frost is of course obvious.

HAMS--TO PRESERVE FROM FLIES.—The skippers, as they are called, are the larvæ of the meat fly. To prevent their attacks we have enveloped the hams and bacon in thick paper, wrapping carefully, so that the meat is completely covered. Then the meat is put into a cotton bag, which is sewn up closely. The fly can not penetrate both envelopes with its ovipositor, and if no holes or small openings are left, the meat may be preserved from it. We have also packed the meat in wheat bran and oats, in boxes and barrels, and have been successful in saving it. But we favor the first mentioned plan.

HAMS—TO KEEP DURING SUMMER.—Take an old flour barrel, or other,

dry cask, and put a good layer of coarse salt in the bottom, and then put down a ham; cover that with coarse salt and put down another ham, and so on till the cask is full, or all put in. Put the cask in a cool dry place; and the hams will all come out perfectly good, provided they went in good.

HAMS—KEEPING.—We have found it a good method in keeping hams and shoulders, to let them hang in the smoke-house, or a tight, dark room, and give a few hours smoking every week or ten days. This will keep out flies and bugs, and keep the meat free from damp and mould.

HAMS—CURING WITHOUT SUGAR.—A lady in Western New York, says in the *Rural New Yorker*, that she cures hams with simple salt and water (brine,) equal to any treated with sugar or molasses and salt. She is careful to place them in the cask shank downward, and while smoking has them on racks, with the rind down, instead of hanging in the usual way, "thus both the pickle and the smoke retaining the juices of the meat." Another correspondent thinks his recipe not only the cheapest but the very best in the world:—"For every 16 pounds of ham take one pint of pure salt, and one ounce of saltpetre. Pack in a clean oak cask, sprinkling the salt between the layers of meat. Dissolve the saltpetre and pour it over the whole, adding sufficient pure water to cover. Soft water is best. Let them lie UNDER the brine six weeks, then smoke.

HAMS—TO CURE.—The committee on bacon hams of the second annual exhibition of the Frederick (Maryland) County Agricultural Society awarded the first premium to Mrs. George M. Potts, and the second to W. H. Lease, Esq., and observed "that the hams were remarkable for their excellent flavor, and were at the same time juicy and tender." The following are the recipes:

ANOTHER RECIPE.—To each green ham of eighteen pounds, one dessert-spoonful of salt-petre; one-fourth pound of brown sugar applied to the fleshy side of the ham and about the hock. Cover the fleshy side with fine salt half an inch thick, and pack away in tubs, to remain from three to six weeks, according to size. Before smoking rub off any salt that may remain on the ham, and cover well with ground pepper, particularly about the bone and hock. Hang up and drain for two days; smoke with green wood for eight weeks, or until the rind assumes a light chestnut color. The pepper is an effectual preventive of the fly. I never bag hams. This recipe took the first premium.

ANOTHER.—When the hams were cool he salted them down in a tight cask, putting a bushel of salt, well mixed with six ounces of saltpetre, to about one thousand pounds of pork; after it had been salted down four or five days, he made a strong brine, sufficient to float an egg, and cured the meat with it, and then let it remain five weeks longer, then hung it up,

dusting the fresh sides with black pepper; then smoked with green wood.

ANOTHER.—After cutting out the pork, rub the skin-side with about half a teaspoonful of saltpetre, well rubbed in. Rub the pieces all over with salt, leaving them well covered on the fleshy side. Then lay the hams in large, tight troughs, skin-side down. Continue this process until it is all salted down. Let them remain in the troughs without touching or troubling them for four or five weeks, according to the size of the hog, no matter how warm or changeable the weather is. Then take them out of the trough, and string them on white-oak splits; wash all the salt off with the brine, if sufficient; if not, with water; then rub them well and thoroughly with wood ashes. Let them hang up and remain twenty-four hours or two or three days before you make the smoke under them, which must be made of green chips, and not chunks. Make the smoke under them every day, and smoke them five or six weeks. After the smoke stops, let the hams remain hanging all the time. Shoulders cure in the same manner. Always kill your hogs in the morning, and let them remain from twenty-four to thirty-six hours before cutting them up.

HAMS—TO PRESERVE.—Hams, after being well salted and smoked, may be preserved sweet a year by packing them down in oats.

HERBS—DRIED.—Herbs are dried by spreading them thinly on trays, and exposing them to the heat of the sun or a current of dry air, or by placing them in a stove-room, observing in either case to turn them repeatedly. When dried in the sun, they should be covered with thin paper, to prevent their color being injured by the light. The quicker they are dried the better, as "heating" or "fermentation" will be thereby prevented. When sufficiently dried, they should be shaken in a coarse sieve, to remove any sand or the eggs of insects that may be mixed with them. Aromatic herbs should be dried very quickly, and by a gentle heat, that their odor may be preserved. Tops and leaves are dried in the same way as whole plants. In every case, discolored and rotten leaves and branches should be rejected, and earth and dirt should be screened off before proceeding to dry them.

HEMLOCK BEER—TO MAKE FOR THE SICK.—Fill a very clean two gallon iron kettle with hemlock branches and cold water, and add two quarts of wheat bran; boil nearly an hour, strain and sweeten it with nearly a pound of sugar, add a teacup full of fresh yeast. As soon as fermentation commences, bottle it for future use. Tried, and found right.

ICE—TO KEEP.—A piece of ice may be kept during several days in the hottest weather, by putting it into a bag of woolen cloth, with double sides, between which a layer, two inches thick, of feathers has been quilted.

IVORY KNIFE-HANDLES—TO PREVENT FROM CRACKING.—Under

no circumstances place them in hot water. The heat expands the steel, which makes its way up the handle a very little, and soon the ivory cracks. Knife-handles should not lie in water, as it soon spoils them.

LARD—Cured with soda.—By following this recipe exactly you will have lard so white and sweet as to leave no cause for complaint for the most fastidious judges. During the whole process remember it is indispensable to work with slow heat. One even table-spoonful of supercarbonate of soda to every five gallons of cut fat—that is to say, just as you cut it up to put on the fire, measure it, and to every five gallons put an even table-spoonful of soda in a pint of water, and dissolve it thoroughly; then pour it over the fat after it is put in the pot. Let it boil till it boils clear, which will not be for some hours if the heat is properly regulated; then take it off and strain it. We always let the lard stand a few minutes after it is taken off the fire before we strain it, or it is apt to unsolder the tin colander. It is best to strain it into an iron pot, and let it stand half an hour longer before it is put into tin or stone vessels. It requires a longer time to dry up lard with soda than without, yet its improved appearance more than compensates for the trouble. With the entrail fat the cracknels are completely dissolved, and you get very little soap grease, but a large quantity of lard. Don't let the leaf fat stay on the fire until the cracknels are too brown. Always strain your lard through a cloth inside the colander.

MEAT—When to cut.—Meat that is not to be cut till cold, must be well done, especially in summer.

MEAT—Pickle—Moist sugar 2 pounds; bay or common salt, 4 pounds; saltpetre, $\frac{1}{2}$ pound; fresh ground allspice, 2 ounces; water 6 to 8 quarts; dissolve. Used to pickle meat, to which it imparts a fine red color and a superior flavor.

MEAT—To keep fresh in winter.—In Minnesota, where winter thaws are not much to be feared, it is quite common to hang up a porker or a leg of venison or beef, and cut from it as it hangs, week after week. It seems to us that meat so kept must greatly deteriorate in flavor. We like best to cut the beef or venison into good pieces for cooking in various ways, and pack them down in snow. Of course they freeze, but thawing a piece brought into cook is a simple matter. Put frozen poultry or meat in cold water, and all the frost will shortly leave it. A coating of ice will be found on the outside, which will easily cleave off.

MAPLE SUGAR.—The business of making maple sugar has, within the past few years, grown immensely. The farmer who intends making sugar, should have all his arragements made in advance so that he will not be hindered when in the midst of his operations. The first thing to be done is to clear the woods of logs, brush and other obstructions to the free pas-

sage of a team in collecting sap. This can be accomplished in a few hours of hard work. The position selected for the boiling house should be on the lower side, so that the sap may be drawn down hill. If possible, it should be placed near a stream of water, so the vessels can be easily cleaned, etc. The boiling house should be comfortable, so that in stormy weather the occupant will not suffer. It should be well lighted, so that dirt of any kind may be quickly seen; the boilers should be placed in the centre, so that the attendant can readily pass on either side. There always should be on hand a good supply of seasoned wood, so that steam can be made rapidly, as quick evaporation is a very essential matter. There should be a reservoir for holding the sap, the bottom of which should be a little higher than the top of the boilers, so that the sap may be easily run into them, with a faucet. It may be made either a square plank vat, or in the form of a broad hooped tub, and should hold at least a gallon for each tree. To prevent the wood from absorbing the sap, and thus producing sourness, the inside should be well painted. It should be covered, to exclude dirt; and for convenience the cover of a trough or vat should be in sections, opening by hinges.

In large establishments it will be most convenient to have the reservoir a large tub or cistern, placed low down, so as to be easily filled, from which the sap may be pumped or ladled into a smaller feeding trough, placed over the boilers. A partition of thick flannel, set vertically, should be placed near the end of the feeding trough, to strain out leaves, bits of bark, dust, etc., before the sap flows into the boiler.

The worst kind of boiler is of cast iron, in the form of cauldron or kettle. Being rounded, the fire strikes the sides and heats them, and whenever the surface rises in boiling, a portion becomes burnt, and the quality is injured. Much fuel is also required to heat such a boiler. The best are made of sheet iron, and are flat and shallow, so that the fire only reaches the bottom, as they rest at the edges for an inch and a half on the brick or stone walls forming the fireplace. A good form for one is described by a correspondent. A convenient size is 3 by 6 feet. The following is his description: Having bought your iron, get it cut the proper size by the tinsmith, or if you have shears large enough to cut it you can do it yourself. Turn over three-quarters of an inch of each inside edge, and lock them closely together with a hammer. Place it on a solid block of wood, and with a punch make a row of holes, half an inch apart, the whole length of the seam. Then put in your rivets, and clinch them tightly. Now with a straight edge mark off 7 inches all around the edges of your iron, then cut it in the shape shown in fig. 207.

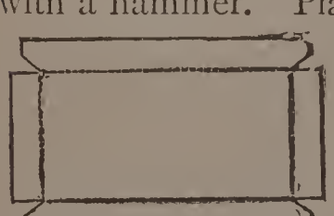


Fig. 207. Pan for Boiling Sap.

Turn up the ends first, next the sides, which will

project beyond the ends; these must be bent over and riveted with two rows of rivets to the ends. Scrape the inside lower corners with a file till they are bright—then apply with a brush a few drops of muriatic acid, diluted with as much zinc as it will dissolve. It can then be soldered the same as tin. The bale should be an iron rod $\frac{1}{3}$ inch in diameter. Get the blacksmith to bend the corners and weld it. To put it on, cut down each corner one inch, and bend the iron round the bale. The last thing is the handles, four in number, which the blacksmith will also make, and you have a finished pan at a very small cost. It will last 12 or 15 years, and is large enough for 200 trees, without much night work. It should have ears or handles run on at the corners for convenience in lifting.

The annexed cut, fig. 208, illustrates an improved form of arch for boiling sap, which is very highly spoken of by every one who has used it. It is very simple, and any mason of ordinary ingenuity can easily make one.

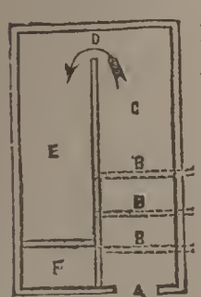


Fig. 208. Fireplace and Pans.

It consists of a double arch for two sheet-iron pans placed side by side. It is made wholly of brick, or can be built on the outside with flat stones.

A is door for wood—B B B three hollow cast-iron tubes to lay the wood upon, extending through the wall at the right hand side. By having them cast hollow, the heat passes out into the open air, making them much more durable. They are three inches in diameter, and placed about six inches from the floor of the arch—C pan—D flue for passage of the fire—E pan—F chimney, or a wide stove pipe will answer as well. The space under pan E need not be more than 12 inches deep, as no wood is placed under it. It should be raised about four inches higher, so that the sap, after it becomes heated, can be carried into the other pan by a syphon rigged with a faucet, so that the flow can be regulated.

The pan C can be made longer than the other, but should not come quite out to the end of the arch, as the sap would be burned on the pan. A better way is to have the pans of the same size, so that they can be changed at the end of each boiling season, as the pan over the hottest fire will burn out much the soonest.

The operation of boiling sap in one of these arches, rigged as I have described it, is as follows: In the morning fill both pans, and then build the fire. The sap in the pan C will be boiling before that in the other; when it is, put your syphon in its place and gauge it so that it will just keep the pan C full; then start the cold sap from the holder (also fixed with a faucet) so as to keep the pan E full also.

This looks very well on paper, *but equally as well when in operation in the sugar bush.* The *advantage* of this kind of arch is economy of fuel.

In the common straight arch a great deal of the heat passes up the chimney, the bricks of which are always so hot as to be unbearable to the naked hand, and when boiling in the night I have often seen the flames *rising a foot above the top of the chimney.*

In the improved kind there is no such waste of heat, and it has been accurately ascertained that the quantity of wood that will boil sap for 100 pounds of sugar in the old, will boil enough for 135 to 140 pounds in the new fashioned arch. A saving of 35 to 40 per cent. in the quantity of fuel, and the cost of preparing it, is worthy the attention of every one that makes maple sugar.

Fig. 209. Cook's Evaporator.

A convenient mode is to have a long, horizontal fireplace, the pan for the fresh sap being placed first in front, and a few inches higher than the other pan, which is nearest the chimney, so that the heated and partly evaporated sap may run from the front to the rear pan through a simple tube, the stream being regulated by a faucet

A little practice will enable the operator to regulate the faucet so that the sap will run a stream into the boiler as fast as the evaporation carries it off. The sheet of flame, after passing the fireplace, should be in a thin stratum, not over two or three inches thick, and this space should be left next the bottom of the boiler. A flame filling a space a foot thick, if spread out to four times its breadth, and only three inches thick, would evaporate nearly four times as rapidly. There should be a damper placed in the flue, so as to control completely the heat as the contents of the boilers approach the nature of syrup, and such a damper is absolutely essential in "sugaring off."

Cook's Patent Evaporator, is an excellent contrivance for boiling down sap, which is admitted at one end and is gradually thickened by evaporation as it passes to the other end, the rockers on which it stands affording the means of regulating the process.

There are two ways of making the spouts, of tinned sheet iron, and of wood. When the former are used, the vessels must be hung up against the tree just beneath the spout, on a nail driven into the tree. Old horse-shoe nails, straightened and sharpened, are good for this purpose. Tin vessels have a hole just below the wire rim, already described, for hanging on the nail; wooden vessels must have a wire hoop. These being hung closely under the spout, the latter need not be more than three inches long. They should be widest where they enter the tree, and be concave so as to follow the incision of the gouge. They are easily made by cutting the tinned iron to a proper size, and then giving the concave form by placing them between a convex and concave pieces of wood, and striking the two

together with a smart blow of a mallet. Ground sharp at the wide end, they are easily driven into the tree. Half an inch into the sap wood is quite deep enough. Many prefer the gouge to the auger, as they think it disfigures the tree less, no other cut being made than that of the gouge; and when the tree begins to become dry, a second cut is as good as the first. The work is done in less time than with an auger.

The best wood spouts are made as shown in fig. 210. Thick inch board will answer for the material. They should be about four inches long, and shaved just large enough at one end to fit the auger hole in the tree. A hole is bored lengthwise through them, for the passage of the sap. In order to have all the right size, bore a hole in a board, and whittle each down till it will exactly fit it. The size should not exceed seven-eights of an inch, nor the hole be bored more than three-fourths of an inch into the tree. The Hook for the pail, fig. 211, is made of very stout wire; when the hole is bored into the tree, the loop of the hook is placed against it, and the spout driven through the loop. A hole bored in the side of the wooden vessel near the top, receives the hook, which should not be bent up so much as the figure indicates. The slight shoulder of the spout holds it against the tree, where it has no purchase, and a heavy weight will not draw it out. Both are easily removed as soon as the sugar season is over, and the necessity of withdrawing nails is obviated.

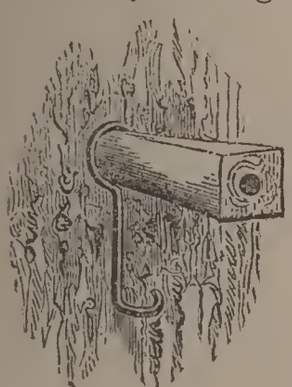


Fig. 210.

Fig. 211.

Both these kinds of spouts are good, and their advantages are nearly equally balanced. One or the other should be adopted, and the pail hung up against the tree (as shown in fig. 213), to prevent leaves being blown into it, to obviate the necessity of blocking up the vessel, as when set on the ground, or settling out of place as the snow melts, to avoid the loss occasioned by the wind blowing the dropping sap out at the side, and to be safe from the accidental visits of swine.

Fig. 213. Pail on Hook.

Before commencing operations, the first and most important requisite for the success of the whole process, must be kept constantly in view, namely, perfect cleanliness.

The sap pails may be made of wood or sheet-tin. Wood is the cheapest, tin the best. If made of wood, they should be smallest at top, to prevent the hoops from falling off, and the better to exclude dust. Good ones, well painted inside, have been offered at $15 per 100. If tin is used, they should be made largest at top, so as to pack away in nets when out of use,

and thus prevent bruising. The top should be stoutly wired, with a hole under the wire to hang on the nail or hook, hereafter described. Manufactured of the best tin, they will cost about $30 per 100, if holding nine quarts; or $25 if holding six. Tin vessels are easily kept clean, and if so, never impart sourness. Well painted wood vessels are nearly as good; but unpainted ones easily become soured.

If possible, never allow the sap to stand in the vessels twenty-four hours. The fresher it is boiled the purer will be the sugar. If the sap sours in wooden vessels at any time, they must be scalded again before using.

When the sap is collected by means of horses and sled, simple open barrels or high tubs answer every purpose; if a circular board, an inch or two less in diameter than the inside of the barrel, float on the sap, it will entirely prevent it from splashing out.

In districts of the country where there is much deep snow in the woods, it is sometimes easiest to collect sap in a cask placed on a hand sled, with runners five inches wide, made of thin boards, shaved thinner where bent. These are somewhat flexible, and on this account run over the snow with a load more easily. The collector should have snow-shoes, if necessary.

Some good manufacturers use lime water to neutralize the minute portion of acid that exists in the fresh sap from the tree. This portion varies; but it is believed that one quart of lime water to a barrel of sap is enough. Where brass or copper vessels are used for boiling, the lime water is indispensable in preventing a slight action on the metal, and dangerous consequences. It should be applied to the sap in the reservoir, before it is run into the boilers.

Sap varies in saccharine strength. Trees growing in open fields, or in exposed places, furnish a richer sap than those in a dense forest. Usually, it needs reducing to about one-twentieth of its bulk, to form a good syrup. When this is accomplished, strain it through flannel into a clean barrel, and let it stand 12 to 24 hours. Then draw it off carefully, through a faucet, leaving the sediment. To save all the sugar in this sediment, more sap is then applied, to dilute the syrup, which in a few hours is drawn off to be returned to the boilers.

The next process is to convert the syrup to sugar. This may be done in one of the pans, but many prefer a separate brass kettle. In either case, the fire should be controlled easily, either by a damper in the flue or by hanging the kettle on a crane. When placed in the pan or kettle, to every gallon of syrup add a beaten egg and a gill of milk to clarify it, keeping it hot but carefully from boiling till the scum has risen and been skimmed off. If eggs cannot be readily obtained, then milk alone may be used. If it boils,

the scum is broken and mixed again with the syrup. In an hour or two most of the impurities will have risen and been removed by a constant use of the skimmer, the fire having been allowed to slacken. Some manufacturers of excellent sugar think the eggs and milk unnecessary, and even detrimental, provided every precaution is taken to keep the sap clean. The scum, which contains much sugar, should be saved, the sugar dissolved in sap, and the latter drawn off, as in the case of the sediment, already mentioned. Before the final heating is applied, a purer sugar would be made by again straining through flannel. The remainder of the boiling should be carefully but rapidly performed. The precise point of time when it will best granulate, is determined in various ways. When the bubbles rising to the surface burst with a slight or just perceptible explosion, from the tenacity of the thickening liquid; or if a drop hot from the kettle into an inch of water forms a distinct solid globule slightly flattened when it strikes the bottom; or if a drop between the thumb and finger will draw out into a fine thread half an inch long—the process has gone far enough. Another mode—that of blowing out a ribbon—is sometimes practiced, and is thus described by a correspondent of the *Country Gentleman*:—Take a short twig, limber it by dipping its end into the boiling sugar, and then form a loop with a hole half an inch in diameter. Dip this loop into the sugar and bring it up quickly, and blow through the loop-hole. When it will go off in a ribbon eight or ten feet long, it is done. It will ribbon a few feet before it is done; but wait a few minutes and try again, till it will perform according to order. This process is something like blowing soap bubbles. It is then poured into vessels to granulate.

The same correspondent thinks it important to add a piece of butter the size of a butternut to a batch of 50 pounds. If there is any tendency to boil over, add a little more butter.

The practice of carrying the syrup to the house, for sugaring off, should not be adopted. It is laborious to carry it, and when there cannot be constantly watched for several hours, to prevent boiling over or burning, which no housekeeper can do and attend to her other duties at the same time. If a proper boiling-house has heen erected in the woods, it will afford every facility for the entire process. A neat shanty, made of rough boards, 18 by 24 feet, may be erected for $25, or less.

To obtain dry sugar, place it in a tub, barrel, or hopper shaped box, with holes for draining off the molasses. To make white sugar, lay a few thicknesses of flannel on the top of the sugar while draining, these flannels to be wet and washed daily with cold water—they will thus absorb and wash out the coloring matter.

A hundred good sugar maple trees will usually make in a season, from

two to three hundred pounds of sugar, when well managed. If every precaution is observed to insure cleanliness, prevent souring, boil speedily and without burning, and to clarify properly, a larger quantity of sugar will be made, and it will be more salable, and command a higher price; and if intended for home use will more than repay him for all the pains he has taken to secure success.

MILK—To PRESERVE.—Milk may be preserved in stout, well-corked and wired bottles by heating them to the boiling point in a water-bath, by which the small quantity of inclosed air becomes decomposed. Milk, or green gooseberries, or peas, thus treated, will keep for two years. Some persons add a few grains of calcined magnesia to each bottle of milk before corking it.

MILK—SOUR, TO RESTORE.—Milk or cream may be sweetened after it has become slighly sour by a small portion of carbonate of magnesia. Saleratus, also, will correct the acid, but it slightly injures the flavor, unless very delicately managed.

MILK—To PRESERVE FROM SOURING.—Put a teaspoonful of scraped horse-raddish into each pan, and it will keep sweet for several days.

MINCE-PIE MEAT will keep well for several months, boiled, chopped, and packed in a stone jar covered with molasses.

ONIONS—To KEEP.—The best way of keeping onions for family use is the old-fashioned style of stringing them. Gather them without breaking off the tops. Take up three or four and string together through the tops, and tie the string around them to secure them firmly. Add more onions, and tie until you have a string a foot or more in length. Hang them in a dry place and they will keep any length of time.

PEAS, GREEN—To PRESERVE.—Carefully shell the peas; then place them in the canister, not too large; put in a small piece of alum, about the size of a horse-bean, to a pint of peas. When the canister is full of peas, fill up the interstices with water, and solder on the lid perfectly air-tight, and boil the canisters for about twenty minutes; then remove them to a cool place, and by the time of January they will be found but little inferior to fresh, newly-gathered peas. Bottling is not so good, at least we have not found it so; for the air gets in, the liquid turns sour, and the peas acquire a bad taste.

PEARS—To KEEP.—Same as apples, but the merits of the pears are greatly increased by their being taken from the vessels about ten days before being used.

PORK—To PICKLE, GUERNSEY FASHION.—For sixteen pounds of pork use a quart of water, an ounce and a half of coarse sugar, a pound and a half of coarse salt, and an ounce of saltpetre; boil for six minutes; skim it

well, and pour it boiling hot over the ham. Turn it every day and keep it one month.

POTATOES, SWEET—To keep.—To keep sweet potatoes through the winter, treat them as the ladies do their dahlia bulbs. Pack them in dry sand, which has been thoroughly heated, so as to drive out all the moisture, and then set them in a warm, dry place. Instances have been known where they have been kept for two years, being stored in a warm, dry cellar near the furnace. Keep them away from moisture. Unlike Irish potatoes, sweet potatoes must be warm and dry.

POULTRY—Keeping.—Judge Buel kept poultry in winter more than two months in a perfect state of preservation, by filling them after they were dressed, with powdered charcoal, and then hanging them in an airy loft.

PRESERVING FRESH FRUIT IN CANS OR JARS.—There are several modes of preserving fruit beyond the ordinary season of its ripening. The simplest is selecting long keeping varieties, and merely placing them away in a cool, dry apartment, on shelves, in boxes or drawers, or in tight barrels. This course, variously modified, is pursued with apples, winter pears, and with grapes. Another way is the old-fashioned, now nearly discarded, mode of preserving in sugar, pound for pound. A third, and in some respects the best mode, is drying the fruit; if rich, high flavored sorts are selected, and the drying rapidly performed, in well ventilated rooms, the result is excellent; but poor fruit, half decayed in the process, never repays the trouble. The fourth mode—that which claims our particular attention at the present moment—is preserving in air-tight cans or jars. For this purpose but little sugar is needed, or no more than to impart an agreeable flavor, and it is therefore well adapted to the present high price of the article.

There are many modifications of the process. The long and minute directions sometimes given, without pointing out the main and essential requisites, have rather served to bewilder than assist the beginner. All that is absolutely necessary is to select good fruit, to heat or cook it, and inclose it in air-tight cases, without any air bubbles or interstices. If kept in a cool place it will remain for months without injury.

Quality of fruit.—It is important that the fruit be well grown and well ripened, as it then contains more and richer juice for preservation. Small, half green, imperfect, half decayed specimens should be rejected.

Jars or cans.—The tin cans, formerly in general use, are now mostly discarded. The acid of the fruit is apt to dissolve the metal, and produce a poisonous compound, and the condition of the fruit cannot be inspected with the eye. Glass jars are now generally employed—earthen succeeds equally well, and are somewhat cheaper, but the fruit cannot be seen. A

large number of patent covers have been invented, possessing various degrees of merit. They may be divided into three classes—those consisting of cork; those made of metal or glass, with cement lining; and those with India rubber lining.

The objection to cork is its porosity, requiring a large amount of cement, through which the air pressing is apt to impart its flavor to the fruit. The India rubber linings are the most convenient and easily applied; but they should be well made, and form a perfect fit; many that have been offered in market, not being tight, have caused the spoiling of the fruit. Different modes are employed to remove the covers in taking out the fruit. The corks should have two small and strong cords placed under them, for lifting them out, the ends of which should be well covered with cement, to prevent the admission of air, or a round piece of cotton cloth may be used for the same purpose. Pincers may be used for drawing the cord or cloth in taking the covers off. The covers may be loosened with the India rubber lining, by inserting the point of a knife.

The annexed figures represent one of the simplest modes of applying the India rubber lining. A ring of this material, about $\frac{1}{4}$ inch wide, and $\frac{1}{8}$ inch thick, is placed in a groove or depression outside the neck, as shown in fig. 214. A tin cap is then applied, which fits closely, and presses against the outside of the band. The upper edge of the jar is ground, so that the tin cover rests flat upon it. Fig. 215 is a section of this arrangement.

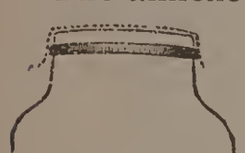


Fig. 214. Top of Jar, with India Rubber Band; Place of Tin Cap shown by dotted line.

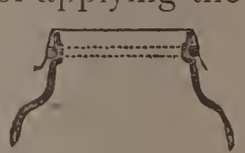


Fig. 215. Section of Top of Jar, with India Rubber Band; Place of India Rubber shown by dotted line.

HEATING THE FRUIT.—The fruit should be heated to nearly or about the boiling point of water, but should not be made to stew or boil, as this would break the form of each specimen, and reduce the whole to a mass. For common family purposes, the best way is to place the fruit in a tin pan, with about as much sugar as will give it a proper flavor, and then set the pan in the top of the stove boiler, where it will fit as a lid; then let the water boil beneath the fruit until the whole is well heated through. Small fruits require less time than large ones. About 15 minutes will be needed for strawberries and raspberries; 20 minutes for cherries, currants, peaches and plums, and half an hour for apples, pears and quinces.

FILLING JARS.—While the heating of the fruit is going on, place three or more empty jars in another boiler, and pour in cold or moderately warm water till it rises nearly to their necks. A heavy weight, as bricks, flat irons, or flat stones, must be placed on these jars, to hold them down; and it is safest to place a few small strips of wood on the bottom of the boiler, before setting the jars in, to prevent their cracking by the heat below. When the

water about the jars has nearly reached boiling, they then may be filled with the fruit by means of a dipper. This work is facilitated by providing a wide tin funnel, fig. 216, made on purpore to fit the mouth of the jar, and it should have a handle a foot long, to prevent any danger of burning or scalding the hand. When the jars are full the contents should be slightly shaken, to start up any air bubbles that may remain, and the water allowed to boil slightly about them for a few minutes. The covers should be then applied, and made air-tight, at the same moment the jars are withdrawn from the water. Before applying the cover, the jars should be so completely filled with fruit that not the least air or space may remain, but the whole be perfectly solid.

Fig. 216. Funnel for filling Fruit Jars, with a rim set on below, to fit outside of neck.

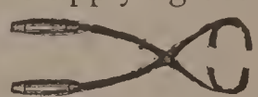


Fig. 217. Pincers for Lifting jars from hot water.

To save the hands from scalding, there should be a pair of forceps, fig. 217, made at the neck of each jar, to grasp it readily in lifting it from the hot water.

The juice of all small fruits furnishes sufficient syrup with the sugar to fill all the interstices; but some larger and drier sorts require sometimes the addition of a portion of syrup made by boiling a pound or two of sugar in a quart of water.

Some persons after having heated the jars, fill them while they are standing on a table, and then replace them, and continue the boiling for a few minutes, or until every air bubble has passed from them, before sealing them tight. Either way will answer, if the work is well done.

Stone jars.—In the absence of common jars, which could not be procured, a friend employed two gallon stone jars with entire success. They were filled as already described, the fruit running out all around as the lid was applied, so as to prevent any vacancy or air, and the whole well cemented. After several months they were opened in perfect condition.

Cement.—The best is made of one part of tallow mixed with about ten or twelve parts of rosin An increase of the tallow softens the cement. The most perfect India rubber linings obviously need no cement; with corks it must be used freely, and is indispensable. The best mode is the following, described in the *American Agriculturist:*

Small tin saucers, or "patty pans," are procured, an inch more in diameter than the mouth of the jar—these may be obtained cheaply, by the quantity, of any tinman.

Fig. 218. Tin Saucer for covering top of jar.

When the jar is filled with fruit, cork is crowded snugly in, and a coating of cement is placed on the top. A portion of the melted cement is then poured into one of the tin saucers, and the mouth of the jar inverted, placed in it—forming, soon as cool, a perfect

air-tight cover, the saucer remaining until the fruit is taken out of the jars. Common tea saucers, and even blacking boxes, may be used instead of tin saucers.

Fig. 219. Fruit Jar filled and covered with Saucer.

QUANTITY OF SUGAR REQUIRED.—Some have stated that they succeed in keeping the fruit without using any sugar; but in ordinary practice it is safer to apply it, and it is best to do so at once, rather than defer it till the fruit is used. Strawberries, peaches, pine-apples and quinces, require but small quantity, five ounces to a quart of fruit being sufficient. Cherries, plums, raspberries and blackberries, require more, or seven to eight ounces.

PUMPKINS—TO DRY.—Stew them first—they will be as good as fresh pumpkins in winter. Finish the drying in a warm oven.

ROOTS—TO PRESERVE.—Market gardeners and those who have a considerable quantity of vegetable roots to keep for winter use, will of course pack them in trenches, but the family supply is usually kept in the cellar. When put loosely into bins and barrels, the roots, if the cellar be a dry one, become shriveled and injured before the spring. This difficulty is avoided by packing in dry sandy earth—the sandier the better. We scrape off a cart-load of soil from a piece that has been recently harrowed, and use this for the roots. Beets, carrots, salsify, parsnips, horse-radish, etc., are laid in boxes or barrels, as may be most convenient, with plenty of earth distributed among them. In this manner the roots are preserved perfectly fresh, and should any chance to decay, which is rarely the case, all odors are prevented from escaping by the earth.

Flower-roots, such as dahlias, caladiums, and cannas, may be successfully preserved by the use of earth, which for them may be quite dry. The tropical roots not only need to be kept dry but warm, and if the cellar is a damp one they can hardly be preserved. A spare closet in a part of the house where there is no danger of freezing, is preferable to a cellar for these.

RUTA BAGAS—STORING.—These roots heat easily, and they require most thorough ventilation, next, to be kept as cool as practicable, without freezing—a little frost will not hurt them, if thawed very gradually. If stored in a cellar, they must not be placed on the bottom of the cellar, but kept a foot above, on a coarse wooden grate, which may be made of rails. This will admit air freely. If heated, they become pithy, and comparatively worthless.

If kept out-doors, they should be placed in ridges, not over three feet wide, and as steep as they will pile, and as long as convenient. Cover well with straw, then with a few inches of earth—in the Northern States, six inches will do. Pat the earth smooth with a spade, to drain off rains.

Then make a hole with a stake or crow-bar, every six feet, and put in a wisp of straw—this allows ventilation.

SAUSAGE, BOLOGNA—To MAKE.—Take a pound of beef suet, a pound of pork, a pound of bacon, fat and lean, and a pound of beef and veal. Cut them very small. Take a handful of sage leaves chopped fine, with a few sweet herbs. Season pretty high with pepper and salt, take a large well cleaned gut and fill it. Set on a sauce-pan of water, and when it boils, put it in, first pricking it to prevent its bursting. Boil it one hour.

SAUSAGES—MAKING.—The following directions were furnished by the *Country Gentleman*, in answer to an inquiry: First, procure a good machine for cutting sausages, instead of doing it by the very tiresome old mode of chopping it by hand. Good ones may be had for some two or three dollars. Then, to every 100 pounds of the chopped meat, add two and a half pounds of salt, eight ounces of sage and ten of pepper—and mix all the ingredients thoroughly. It is a common way among housekeepers to "cut and try"—that is, add a little more salt, and a little more pepper and sage, tasting, and re-tasting, and calling in the aid of the palates of others, till the thing has too much pepper and salt, and is probably spoiled. The above rule is simple, easy, and good.

SAUSAGES, SUMMER—To MAKE.—Take equal quantities of sweet salt pork and lean veal; chop them finely, and to every pound allow one tea-spoonful of very finely-minced sage. Add a seasoning of pepper and salt, and mix the whole well together. Inclose a small quantity of the meat in thin puff-paste in a round shape, like a sausage, and bake for an hour or more, or fry like an ordinary sausage, with only a dusting of flour to keep the meat firm.

SAUSAGE MEAT is best preserved in new cotton bags a foot long and two or three inches in diameter, which after filling are dipped in and coated with melted lard. When used, the bag is sliced off with the meat, as it is much easier to make new ones than to preserve the old.

SUET—To KEEP.—When sirloins of beef, or loins of veal or mutton, are brought in, part of the suet may be cut off for puddings or to clarify. Chopped fine and mixed with flour, if tied down in a jar, it will keep ten days or a fortnight. If there be more suet than will be used while fresh, throw it into pickle, made in the proportion of one-quarter pound of salt to a quart of cold water, and it will be good afterwards for use, when soaked a little.

SYRUP—BLACKBERRY.—Blackberry juice, 1 pint; clarified sugar, 2½ lbs.; brandy or whisky, ½ glass. Dissolve the sugar by the aid of heat in the juice, and when cold add the spirits.

SYRUP—AROMATIC BLACKBERRY.—The aromatic blackberry syrup is

made by taking aromatic syrup instead of clarified sugar. The former is made in the following way: Refined sugar, 5 pounds; water, two pints; bruised ginger, 1 ounce; cloves, ½ oz.; calamus root, ½ oz.; nutmegs, 1 oz.; boil for two hours the ginger, cloves, calamus, and nutmegs in the water, strain and dissolve the sugar, and when near cold add oil of bitter almonds, 4 drops; essence of cinnamon, 15 drops; essence of nutmegs, 1 tablespoonful; essence of lemon, 20 drops. Stir the whole well until the oils are perfectly dissolved.

SYRUPS—To color.—Powdered cochineal, 1 oz.; soft water, 1 pint; boil the cochineal in the water for a few minutes, using a copper kettle; while boiling add 30 grains of powdered alum, and 1 dr. of cream of tartar. When the coloring matter is all out of the cochineal, remove it from the fire, and when a little cool, strain, bottle, and set aside for use.

SYRUP—Lemon.—Coffee sugar, 3 lbs.; water 1½ pints; dissolve by gentle heat, and add citric acid, 3 oz., and flavor with oil or extract of lemon. Or take citric acid in powder, ¼ oz.; oil of lemon, 4 drops; simple syrup 1 quart. Rub the acid and oil in 3 or 4 spoonsful of the syrup, then add the mixture to the remainder, and dissolve with gentle heat.

TOMATOES—Sweet pickled.—One peck of green tomatoes sliced—six large onions sliced—strew a teacupful of salt over them; let them remain over night, drain off in the morning, then take two quarts of water and one of vinegar, boil them in it fifteen or twenty minutes; after boiling put them in a sieve to drain, then take four quarts of vinegar, two pounds of brown sugar, half pound white mustard seed, two table spoonfuls of ground alspice, same of cloves, cinnamon, ginger and mustard, and one tea-spoonful of cayene pepper, put all in a kettle and cook fifteen minutes slowly, and they will be splendid pickles.

VEGETABLES—Packing for winter.—There are two ways in which farmers usually deposit their vegetables in the cellar for winter, one of which we are sorry to say is too common, is to take them up without much care, and with what earth happens to be adhering to them, and throw them into a pile in one corner or other part of the cellar, where they remain till wanted for family use. We here allude to such vegetables as beets, carrots, parsnips, turnips, etc. If the cellar happens to be damp, many of them decay or lose their flavor; if it chances to be a dry one, a portion of them become shriveled and too dry for use. The heaps are overhauled repeatedly to find such as are good for the table, and these confused and scattered heaps present anything but a tidy appearance, while the decaying ones produce an unhealthy air. We have adopted another way, which we like much better. A few bushels of fine clean moss is obtained from dense woods or from swamps. Clean barrels or smooth-planed boxes are taken to the garden

(a dry day being selected for the occasion) and the vegetables being taken up, well cleaned, topped and trimmed, are placed in the barrels or boxes, with alternating layers of soft, damp moss; when filled, the hand cart or wheelbarrow conveys them to the cellar. The moss keeps them clean and sufficiently moist, preventing the accumulation of water on the one hand, and the drying and shriveling of the roots on the other. They are always fresh and ready for use, and are taken out from under the moss without the least difficulty. As the barrel is successively emptied, a portion of the moss is taken off and placed in another one for future use. In case you cannot obtain moss, clean, moist sand may be substituted. It is, however, heavier and more difficult to handle, and the vegetables do not come from it so clean and fresh as from moss.

VINEGAR—MAKING.—Vinegar is made from cider by exposing it in barrels not quite full, with the bung open, in a warm place, as the south side of a building, to the full action of the sun's rays. The addition of a quart or two, or even a gallon of molasses to each barrel, hastens fermentation, and makes better vinegar. The addition of a sheet of brown paper placed upon the surface also hastens fermentation, by giving additional facility to the action of the air. The mother in vinegar consists of the concrete organic matter in the cider, which promotes fermentation, and then settles to the bottom in a sort of gelatinous mass. We suppose the old-fashioned way of separating the vinegar from it, described by Dean Swift, is as good as any, namely—

> "First rack slow, then rack quick,
> Then rack slow till you come to the thick."

Purifying by distillation makes the vinegar nearly colorless, but this mode is only adapted for druggists. Vinegar is sometimes manufactured in the course of a day or two with great rapidity, by allowing it to trickle through small holes in the bottom of a pan placed on the top of and fitting a barrel, which is filled with shavings. The vinegar runs down the surface of the shavings, and is thus thinly exposed to the air, which causes a rapid fermentation completing the process, if skillfully conducted, in forty-eight hours.

WINE, BLACKBERRY—HOW TO MAKE.—1. Having procured berries that are fully ripe, put them into a tub or pan with a tap to it, and pour upon them as much boiling water as will just cover them. As soon as the heat will permit the hand to be put into the vessel, bruise them well till all the berries are broken. Then let them stand covered till the berries begin to rise toward the top, which they usually do in three or four days. Then draw off the clear liquor into another vessel, and add to every ten quarts of this liquor four pounds of sugar; stir it well and let it stand to

work a week or ten days; then filter it through a flannel jelly bag into a cask. Take now four ounces of isinglass and lay it to steep for twelve hours in a pint of blackberry juice; the next morning boil it over a slow fire for half an hour with a quart or three pints more juice, and pour it into the cask; when cool, rouse it well and leave it to settle for a few days, then rack it off into a clean cask, and bung it down.

The following is said to be an excellent recipe for the manufacture of a superior wine from blackberries:—Measure your berries, and bruise them, to every gallon adding one quart of boiling water. Let the mixture stand twenty-four hours, stirring occasionally; then strain off the liquor into a cask, to every gallon adding two pounds of sugar; cork tight, and let stand till the following October, and you will have wine ready for use, without any further straining or boiling, that will make lips smack, as they never smacked under similar influence before.

WINE—Elderberry.—To every quart of berries add one quart of water; boil half an hour; run the liquor and break the berries through a hair sieve; then to every quart of juice add three-quarters of a pound of sugar; boil again one-quarter of an hour, with Jamaica peppers, ginger, and a few cloves; when sufficiently cool, pour into a barrel a cup of yeast and a piece of toast to assist the fermentation (to be kept in a warm place.) When it ceases to hiss, add one quart of brandy to eight gallons of the liquor; then close the barrel perfectly air-tight, and keep in a cool place for six months, when it will be fit to bottle.

WINE—Grape.—Bruise the grapes, which should be quite ripe. To each gallon of grapes put a gallon of water, and let the whole remain a week without stirring. Then draw off the liquor carefully, and to each gallon add three pounds of white sugar. Let it ferment in a temperate situation; when fermented, stop it up tight. In the course of five months it will be fit to bottle.

KITCHEN-GARDEN,

FLORICULTURE AND GREEN-HOUSE.

The following hints are not to be understood as full directions, but as timely suggestions to assist in the performance of the various operations of the garden in their proper season, as delay or neglect from forgetfulness frequently leads to poor success or entire failure. We give the work for each month separately.

WORK FOR JANUARY—KITCHEN-GARDEN.—Little can be done out of doors in the Northern or Middle States, or in fact in the Southern States. Various preparations may, however, be made which will essentially lessen labor and care, when active out-door operations commence.

Hot-bed frames (figs. 220 and 221) may be constructed or repaired. Nothing is better for the inside of the boards which come in contact with the earth than two or three good coatings of gas-tar, applied hot, when the boards are perfectly dry. It will preserve them from decay many times longer than if unprotected. The outside may be painted with common yellow ochre paint. If any glasses in the sash have been broken, replace them and secure any that are loose. Of the various substitutes for glass, such as varnished muslin, oiled paper, etc., none will compare to glass itself. Hand-glasses, of various forms, may be now made ready for spring use. Fig. 222, is a hand-glass, made by sliding a pane of glass on each side of a double-sloped box, in tin grooves nailed on each edge, with a wire loop for handling and hanging up. Fig. 223, is a box hand-glass. Fig. 224, is a long hand-glass for drills.

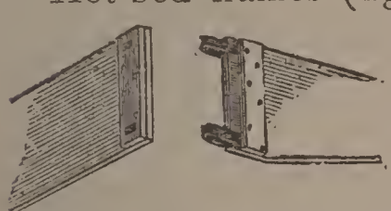


Fig. 220. Corners for hot-bed frames.

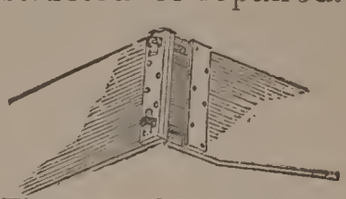


Fig. 221. Mode of connecting corners of hot-bed frames.

Fig. 222.

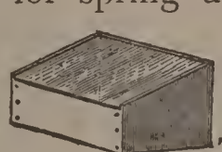


Fig. 223.

Fig. 224.

Procure or prepare bean-poles and various stakes, brush for peas, etc.; as the latter is most easily inserted by means of a good sharp dibbler, procure one or two of these tools. A blacksmith may manufacture one with a steel point, in a hol-

Fig. 225. Dibbler

low, conical form, into which an old spade handle may be inserted, as shown in fig. 225. Bean-poles are best inserted in holes made with a crow-bar.

MANURE.—As nothing is more important than plenty of manure for successful kitchen gardening, every means should be resorted to for an abundant supply. Thoroughly prepared compost is always best, and the beds may be commenced in winter. As long or fibrous manure can never be intermixed well with garden soil, it should be used only in such compost-heaps (figs. 226 and 227) as are to remain over summer. If spread in thin, alternate layers, with loam, peat, turf or leaf-mould, and the heap worked over and made fine, after laying several months, it will then constitute an excellent enriching material. A sprinkling of fresh or leached ashes on each layer, as the heap is made up, will add to its value. Manure in a fresher state will answer well for many crops, provided no straw or long litter is used, and the manure is thoroughly and finely incorporated with the soil when applied. In this case it will be necessary to avoid the use of straw for litter (unless chopped short) and use saw dust or leaves. A pile of strong, fresh manure should be reserved for early hot-beds.

Fig. 226. Well made compost heap with thin layers.

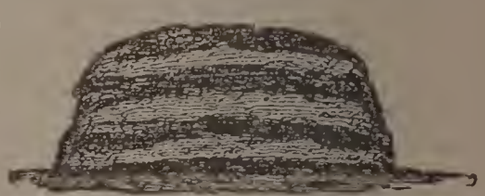


Fig. 227. Badly made compost heap, or with thick layers.

IF ASPARAGUS BEDS were not mulched or coated late in autumn, the work may yet be performed. The chief object of this operation is to protect the plants, and to furnish liquid manure for the roots, both of which accelerate the early growth of the shoots.

FLOWER GARDEN.—Cuttings may be prepared of hard decidious shrubs and packed away in cellars, in boxes of damp moss. Hardy shrubs, set out in autumn, may be mulched with manure; it will tend to protect the roots from cold, assist in enriching the soil, and prevent the ground from becoming hard and crusted in spring. In the Middle States, where the ground is not frozen, beds for the spring planting of flowers may be cut in turf, and the excavation filled with enriching materials; and trenching, where necessary, may be performed. Marking sticks, rods for tying up flower stalks, and structures (fig. 228) for supporting climbers may be made.

Fig. 228. Support for climbers.

GREEN-HOUSE.—As plants in the green-house, during this season of the year, are mostly in a nearly dormant state, they need but little watering. The soil may be examined, and if moderately or slightly moist, that is amply sufficient. The temperature should be about 45 or

50 degrees in the day time, and 35 to 40 degrees at night. *Never lower than 35 degrees.* Watch the thermometer sufficiently to prevent all danger from freezing. In very severe weather, exterior matting must be resorted to, and every chink and hole through which cold creeps through carefully closed up.

SEEDS.—These should be procured at the earliest practicable moment. Get the very best, and from the most reliable sources. Buy nothing that is cheap, for in the end they are the highest priced. It is not economy to prepare ground in fine condition at much expense, and then grow poor vegetables, or lose a crop by the failure of seeds.

WORK FOR FEBRUARY—KITCHEN GARDEN.—Read carefully the directions for the month of January, most of which will be applicable throughout the present month. Hot-beds for the early forcing of cabbage, tomatoes, egg plants, etc., may be made in the Middle and Southern States, procure a supply of fresh manure for these, and old or decayed manure or compost for spring application to open ground. Composts, worked over and made fine, greatly exceed in value coarse and imperfect mixtures.

Hardy grapevines, currants, and gooseberries may be pruned. Examine tools and see that they are all in repair. Procure the very best, now that labor is so high priced—for a tool costing two dollars, and enabling a workman to do fifty cents more labor per day, will pay for itself many times over during the season. Seed drills, and all implements for saving labor, should be procured.

BEETS.—The Bassano is the best early variety; it is flat, somewhat like a flat turnip, but more ribbed, and varies from four to six inches in diameter. It is not suitable for long keeping, becoming coarse and fibrous. It is succeeded in a few days by the early Turnip Beet (fig. 229,) which is better for long keeping, and is adapted to extensive cultivation. The Long Blood Beet is also an excellent beet for cultivation, and for late planting for winter use. Its long continued culture has led to much variation, and hence the importance of selecting seed and securing the best varieties. The improved Long Blood (fig. 230) is larger and longer than the common variety, sometimes extending to near two feet long. It is very dark in color, being nearly blackish-purple.

Fig. 229.

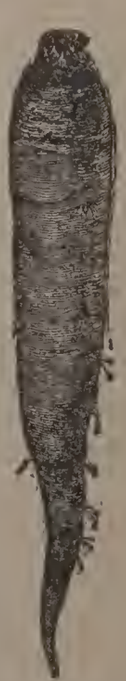


Fig. 230.

TURNIP.—The Purple-top Strap-leafed (fig. 231,) is one of the most valuable varieties. It is productive and excellent in quality, the flesh being clear, white, firm, rich and well flavored. The White Top Flat (233) is of medium size and uniformly white in color. The leaves are few and small, the flesh white, firm and

Fig. 231.

well flavored. The White-top Strap-leaved is similar to the Purple-top Strap-leaved, but differing in color—both excellent in quality (fig. 232.) The Yellow Malta is a handsome, small bulbed, early variety and is one of the best yellow turnips for summer use. The Yellow Stone is also an excellent variety.

Onions.—The Large Red Wethersfield (fig. 235) is of very large size, and, yielding heavy crops, is extensively cultivated. It is one of the best for keeping. It is often five inches in diameter, and three in depth; the skin is deep purplish red; the flesh purplish white. The Silver Skin Onion (fig. 236) is of medium size, with a skin silvery white; the flesh is white, fine grained and mild flavored. It is

Fig. 232.

Fig. 233.

Fig. 235.

Fig. 236.

Fig. 237.

a poor keeper, which is its chief objection. It is, however, well adapted for sowing at the close of summer, for early use, or marketing in spring. The Yellow Onion (fig. 237) is an excellent variety, widely known and extensively cultivated. It is rather above medium in size, has a yellowish-brown skin and a nearly white, fine-grained and well-flavored flesh. The Danvers Onion is a sub-variety, greater in productiveness but not so good a keeper.

Radish.—The Olive-shaped is the best early; the long scarlet (fig. 238) is the best for general crop. The Black Spanish is sown late, for winter use.

Fig. 238.

Cucumbers.—The early cluster (fig. 239) is small and very early. It is quite productive and a popular early garden sort, but is not adapted for pickling. The Early Frame is a few days later, and is a well known and a good sort. The Long Green is one of the best for general use.

Fig. 239.

Melons.—The Green Citron (fig. 240,) is nearly round and regularly ribbed; in size medium or rather small, skin green and thickly netted; flesh green, very juicy, with a rich and sugary flavor. It is uniformly excellent, quite productive and is one of the most valuable varieties. The Large Netted Muskmelon (fig. 241) is large, oval, strongly ribbed, thickly netted, yellow.

Fig 240.

flesh yellow, thick and sweet, but not so juicy and melting as the last; hardy, and well adapted to common cultivation.

WATERMELONS.—The Black Spanish is large in size, roundish or oblong, somewhat ribbed, skin very dark green, flesh deep red, fine grained, sweet and excellent; seeds nearly black. The Carolina Watermelon is large, oblong, deep green, variegated with pale green; flesh granular, crisp, sweet, and of a good quality; seeds black. The Mountain Sweet watermelon is similar in form, but of a darker green; seeds brown.

SQUASHES.—Among the numerous varieties, the following rank as some of the best: Summer Crook-neck, fig. 242, is bushy in habit; fruit medium in size, measuring about eight inches in length; bright yellow, warty. It is soft, and easily penetrated by the nail, when young and at a proper age for use. It afterwards becomes harder, and the flesh coarse and unfit for cooking. The scalloped, fig. 243, is early, erect in growth, fruit somewhat hemispherical in form, deeply and regularly scalloped. It should be used when not more than half grown. It is not quite so dry and sweet as the summer Crook-neck.

Fig. 241. Large Netted Muskmelon.

Fig 242.

Fig. 243.

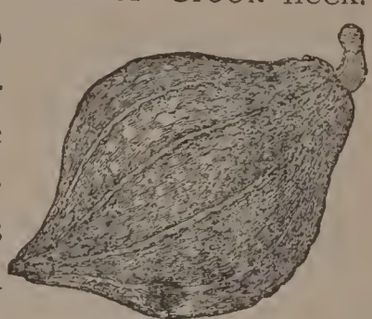


Fig. 244.

The right time for using these two varieties is easily determined by piercing them with the finger nail. The Hubbard Squash, fig. 244, is an excellent variety, which has of late years become widely known for its excellent quality and long keeping. The form is an irregular oval, or somewhat like a double cone; surface knotty, dull green; flesh rich, yellow, fine grained, sweet, dry and excellent; keeps well through the winter, but is rather best when nearly fresh. Sweet potato squash, fig. 245, is somewhat similar to the Hubbard, but is larger and smoother, and the skin much lighter in color. The flesh is yellow, fine grained and sweet, nearly equal to the Hubbard. Winter Crook-neck, fig. 246, is an old, widely known sort, remarkable for its productiveness and ease of cultivation. It is quite variable in size, form and quality.

Fig. 245.

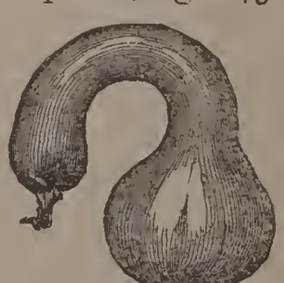


Fig. 246.

All these, as well as other varieties of the Squash, should be planted far

away from each other. Two varieties in the same garden, even when planted at opposite sides, will become intermixed and deteriorate.

SEEDS.—Observe the remarks under last month, and obtain the best selected seeds, from the most reliable sources. Plant but few varieties, and these the best—but a share of the new sort may be placed on trial, on a small scale. Among the leading kinds the following varieties may be mentioned as worthy of planting for general crops. Figures and descriptions are given of several of these, to assist in identifying the varieties, and for preventing mistakes.

Fig. 247.

CABBAGE.—The Early Sugar-loaf is the earliest variety, but must be used as soon as the heads become solid, as it will not keep long. It is immediately followed by the Early York, one of the oldest, most popular and best early sorts. The Winter Drumheads, of which there are several sub-varieties, are the best for winter use. The *Savoys* are distinct varieties; remarkable for their tender and delicate texture, but they do not head so compactly as the common sorts. The Green Globe Savoy (fig. 247,) is one of the best and most commonly known. As it requires a long time to perfect its heads, it should be planted early, have rich soil, and receive good cultivation. The Red Cabbage is desirable for pickling.

ASPARAGUS BEDS should be forked up the moment the frost leaves the ground, turning under the manure applied in autumn, and avoiding injury to the crowns or forming shoots.

PIE-PLANT may be obtained early by covering each plant with a barrel open at top and bottom, and filling it loosely with manure; the stalks will grow up through the manure and become large, blanched, tender and excellent.

EARLY POTATOES may be accelerated by placing the cut roots closely together in a hot-bed, and covering with a few inches of earth. Set these out when the sprouts have about reached the surface, and a week or two will be gained by the operation. If allowed more room in a hot-bed, they may be set out when two or three inches high; but in either case the transplanting should not be done so early as to cause danger from frost.

LETTUCE, sown in autumn, transplanted into the hot-bed, will come forward earlier than if sown there.

EARLIEST PEAS may be planted as soon as the ground admits working.

HOT-BEDS in the Northern States, for ordinary purposes, should not be made before the 20th. If made earlier, for prolonged forcing, they will need encasing in fresh manure before the old heap becomes spent.

MANURE, if not spread in autumn, should be applied as early as practica-

ble to open ground; and if the soil admits, worked in towards the close of the present month. Remember that manure thoroughly and finely intermixed with the soil is worth more than double such as is left in lumps or masses, or deeply spaded under in a single stratum.

FLOWER-GARDEN.—It will be well to read directions for work for January. Sticks, rods, and structures of all kinds for supporting flowers and climbers, being at all times exposed to the weather, should be protected from decay by paint. Nothing is better for this purpose than a good coat of paint. Avoid rendering them conspicuous by painting white; small rods may be green; larger structures appear much the best if painted brown. But of course each one can use his own judgment as to colors. To prevent decaying at the joints, apply a thick coating of gas tar at those places when they are put together. Stakes, poles, etc., should be well coated with the same material where they enter the ground.

Hardy shrubs may be pruned for the purpose of bringing them into symmetrical shape; in case they grow too freely cut off the longer leader; if too feeble, thin out the flower spurs.

GREEN-HOUSE.—As the temperature of this month is about the same as January, you will follow the directions about the same as given for that month, and also as to the watering of the plants. Plants beginning to grow will need more water, as they throw off a portion from their fresh leaves; but one important point is, don't overdo the matter. Too much water causes as much injury as not enough. Keep both shrubs and plants, as soon as they commence growing, pinched into compact symmetrical shape, and by all means avoid one-sided and long-stemmed growth. Remove decayed leaves and everything that is adverse to neatness; destroy insects by fumigation with tobacco and a solution of whale oil or soft soap. Re-pot or top-dress the soil when necessary.

Fig. 248. Well trained green-house plant.

WORK FOR MARCH—KITCHEN-GARDEN.—During this month open ground work can only be performed in the Middle and Southern States, and the former as late as the latter part of the month, and even then it is risky. It is better to wait till danger from cold and freezing storms has passed.

FLOWER GARDEN.—New beds for planting annuals, berbaceous perennials and shrubs, if not made last autumn, should be made as early as the ground opens. That the enriching materials may become thoroughly diffused through the soil, hardy perennials and bulbs should be divided and set out as soon as the soil will admit, as they commence growing early.

Hardy shrubs may be transplanted at the same time, or afterwards. Be careful to spread out all the fine roots, and fill among them well with fine soil; cut the shoots back well, to give them a good form, and to cause a fine start. Sow annuals in hot-bed for early flowering. Tender shrubs and plants, and half hardy bulbs, which were covered with leaves or evergreens in winter, should have this covering gradually removed as warm weather approaches. Clear away all unnecessary litter, and keep the ground neat and clean.

Fig. 249. Well planted shrub.

Hardy roses should be pruned before the buds open, and enriching materials applied to the soil. The fresh start thus given them will furnish a finer and more copious bloom.

Box edging may be re-set towards the close of the month. If, as sometimes happens, the plants have grown tall and large, set them deeply in a narrow trench, spread out the branches like a fan (fig. 250,) and press the earth, as the trenches fill, compactly against them; then shear off the whole row nearly to the ground. These will all grow and leave no gaps. New lawns should be sown heavily with suitable grass seed (at the rate of two bushels or more to the acre,) as early as the ground can be prepared and properly mellowed. The seed will start early, and grow beyond the reach of summer drought, and being mown every week, will form a beautiful turf the same year. Lawns formed by sodding should be made very early, before the grass starts, and the turf laid closely and compactly, so that there may be no crevices between the cut portions or beneath them.

Fig. 250. Setting out box edging.

GREEN-HOUSE.—Air very freely in fine weather. This is important. Head back oranges or give them a proper shape. Give water more freely to plants in full growth. Remove all dead leaves, trimmings and rubbish, as well as dust, from the leaves, and moss or mould from the outside of the pots, and give the whole apartment a neat and fresh look. Carnations may be layered, and fuchsias propagated by cutting. Re-pot and prune plants.

One important point about temperature. These directions apply only to green-house plants (and not for those from tropical regions requiring a high heat) the temperature sould be continued moderate, or from 45 to 60 degrees.

WORK FCR APRIL—KITCHEN GARDEN.—Complete the labors directed in March, prepare the ground for early crops as soon as the earth is sufficiently dry. With heavy soils, at least a week or two may be gained by under draining; and sometimes the same excellent effect may be attained

by the addition of sand from any source where it can be obtained. It will be observed that the application of sand has this great advantage over manuring—it remains perpetually in the soil. In the Northern States all the early garden crops may be planted soon after the opening of this month, if a good soil has been prepared. Hardy plants, such as parsnips, carrots, beets, and onions, may be sown as early as the ground is fit for them. Those more sensitive to cold, such as beans, cucumbers and squashes, cannot be hurried by early planting; but only by fowarding in hot-beds, or starting under glass.

Asparagus should be transplanted very early or before the shoots appear. It will continue longer and flourish better if two distinct beds are provided and shoots cut from them alternate seasons; a continued cutting from the same bed has a tendency to check the roots. The old practice of digging a pit three or four feet for asparagus, and filling it with a rich compost of manure and soil, is unnecessary, and induces planters to place the roots too closely together, in order to obtain all they can from the bed. The shoots will be larger and better if the plants are allowed plenty of room on a soil less than half as deep, with constant cultivation to keep the surface mellow. Asparagus beds covered with manure litter in autumn or winter, should have this forked in as soon as the soil thaws, avoiding injury to the crowns.

Hot-beds may be made in the Northern States by the first of the month, and will prove useful in forwarding young cabbage, tomatoes, lettuce, radishes and cucumbers, as well as many other vegetables. Cucumbers and other plants which do not bear removal well, should be planted in pieces of inverted turf or in small pots.

In planting seeds it is important to observe a proper depth corresponding with the size of the seed. More injury is done by deep than shallow planting; unless the work be postponed late in the season, when the soil is quite dry. We have known unskillful gardeners, for example, to cover beets two or three inches deep, very few of which come up, and the seedsmen denounced as a consequence. Seed from the same parcel covered scarcely an inch in depth came up copiously. Avoid superficial waterings of planted seed in dry weather, as it only serves to moisten and crust the surface.

As soon as young crops appear, keep the soil constantly mellowed to accelerate growth and destroy weeds. In all instances never work a strong soil when wet or adhesive, whether for planting seeds or for cultivating it.

Flower garden.—The first work is to clear away all rubbish and stalks of plants, straw, leaf or manure coverings, etc. The sooner the beds for annual flowers can be prepared the better, in order that the compost mixed with the soil may become thoroughly incorporated. Seeds of very hardy plants which start readily or spring freely from self-sown seeds in

autumn, may be sown early in spring. Others which germinate with more difficulty, should not be put in until later, or when the soil has become warm. Many seeds are lost and disappointment caused by planting them too soon. If the soil is too dry to start them readily, it may be kept moist for a few days by a covering of matting or sacking, and the young plants may be protected by placing over them a box or broad hoop stretched with thin muslin, or inverted flower pots, fig. 251, slightly propped up on the south side. Care must be observed in the depth of burying the seed. Very small ones, such as the Portulacca, should not be half an inch deep, the moisture of the surface being preserved as above described.

Fig. 251.

The great secret of success in raising beautiful annual flowers is, 1st, a good selection of sorts; 2d, a good, well prepared soil; 3d, thinning out so as to give plenty of room for each plant; and 4th, pinching in during growth, so as to form neat, symmetrical, densely blooming plants. Annual flowers which have been started in hot-beds should not be set out before the end of the month or later.

Biennials and perennials sown a year ago should be reset, giving each plant sufficient room. Stools of perennials which have become large, and which it is desired to multiply, should be taken up and carefully pulled asunder and re-planted—doing the work very early, before growth has commenced. The growth of dahlias may be started in pots within doors.

Hyacinths shaded from the sun at the commencement of blooming, will be finer and continue longer.

Toward the end of the month care should be given to mellowing the soil in flower beds, especially in those occupied with perennials, where it is liable to become crusted.

Lawns should be sown as early in the spring as the ground can be prepared, and the seed very thickly sown, brushed, raked or rolled in. It will start more evenly and densely than if the sowing is done later, being careful to sow it once a month during the season.

Gravel walks should be constantly kept in clean condition—nothing can make a flower garden appear well where the walks are neglected or left uneven, or with ragged edges, or with irregular or angular border-lines. Let them form graceful curves and possess a neat, smooth, finished surface, and they will give character to almost any grounds they traverse.

Flower-beds and edgings.—The modern practice, which is undoubtedly the best in every respect, for economy, beauty, and landscape effect, of cutting circular, elliptical and arabesque beds in smooth turf, nearly obviates the necessity of forming edges to these beds; hence the lessened demand for box edging and plants of a similar character. In

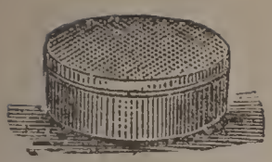


Fig. 252.—Flower Bed, cut in turf, with tile edging.

some cases, however, such may be desirable, and if placed on lawns, nothing, perhaps, is better than ornamental tile of a soft, brown color made for this purpose, projecting but slightly above the surface. Edging made of growing plants is only applicable to beds which do not border on grass. Box, if well planted or started, and kept properly shorn down, forms a neat edging for a few years; but as it becomes older loses its fresh appearance and is liable to be killed in spots. The smaller species of iris form stout, vigorous edgings, easily kept within bounds. A neat and good edging is also formed of the Blue-eyed grass or *Sisyrinchium*, a native plant, growing frequently in wet meadows throughout the country.

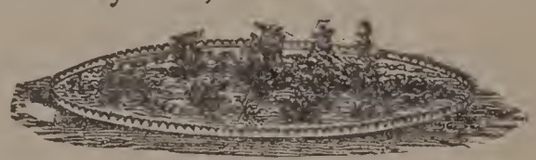


Fig. 253.—Tile Edging.

Insects, as warm weather approaches, will begin to make their appearance. Use the usual appliances of tobacco-water, tobacco smoke, white hellebore, soap-suds, etc.

GREEN-HOUSE.—Accustom the plants to fresh air whenever the atmosphere outside becomes warm, lessening fire as the season advances, or keeping it up only at night. Place the hardiest plants nearest the draughts of fresh air. Water sufficiently such as are growing rapidly, and sparingly those more nearly in a dormant state. Syringe frequently. Apply liquid manure to feeble plants, and cut back old or stunted ones to start new shoots. Pinch back such as are freely growing, to give them symmetrical form. Give fresh soil when necessary, and keep the earth well loosened. Make cuttings of verbenas, petunias and fuschias.

WORK FOR MAY—KITCHEN-GARDEN.—Complete the work laid out for April. Finish sowing hardy vegetables; and as soon as the soil becomes warm plant beans, cucumbers, melons and squashes. Set out plants from hot-beds, and re-sow failures. Thin cut plants where thick, and constantly destroy all weeds on their first appearance. Insects will begin to multiply—one of the very best remedies for them is a brood of young chickens, which may be placed in any desired part of the garden, by confining the hen to a coop. The striped bug, so destructive to cucumbers and squashes, may be destroyed by passing around twice a day and killing with thumb and finger,

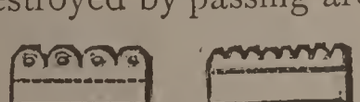


Fig. 254.

or they may be kept off by means of boxes covered with fine netting (fig. 254.) Small cheese boxes answer a good purpose, being prepared similarly to the circular shade for flower seeds represented in the directions given for April.

Keeping the surface of the soil constantly fine and mellow, will serve to retain a sufficient degree of moisture better than any watering.

Water-melons usually succeed best on light warm soils; but heavy soil may be made to produce them in great abundance by intermixing thoroughly a copious supply of fresh manure to a depth of twenty inches or more and several feet in breadth, raising the surface to a height of about one foot.

There are several varieties of sweet corn, but Darling's Early (fig. 255) we believe to give the greatest satisfaction.

A few special directions, familiar to experienced farmers and gardeners, but perhaps useful to others, may be briefly given: Plant peas for succession. Different varieties of squashes and melons which intermix, should be placed remote from each other—tomatoes transplanted from hot-beds, giving about four feet square for each plant, and if they grow luxuriantly, so as to more than cover this space the soil has been too highly manured, and they should be placed on land of less fertility—seeds of doubtful quality should be tested before sowing largely—insert poles for running beans before they are planted. The Lima will ripen, being on the south side of a building or wall; long beets for the main crop may be sown toward the close of the month. The hand glasses mentioned in the directions for a former month may be used for covering tender plants when frosty nights are feared.

Fig. 255.

FLOWER GARDEN.—Follow the directions given for April for preparing the ground and planting seed. Re-plant annuals from hot-beds, and thin out where too thick, a common reason why they do not grow and bloom well, is overcrowding the surface. Shades or awnings placed on tulips will much prolong the blooming season. Early bulbs, when the leaves are dead, should be taken up and packed away, marking each sort accurately. Fall flower stalks likely to be broken down with wind, should be tied to neat stakes. Branching ornamentals, tending to grow tall and meagre, should be pinched back while growing, to give them a more compact form

KEEP GRAVEL WALKS neatly dressed, mellow the surface of flower beds, mow lawns once a week or oftener, and preserve a neat appearance in the whole grounds.

BEDDING PLANTS from green-houses may be set out during the latter part of the month, such as verbenas, salvias, etc.

Care should be taken, in forming flower-beds, whether of annuals, hardy perennials or bedding plants, not to mix together those of dissimiliar character, and especially those quite unlike in habit and height. Where flower-beds are cut in lawn, each entire bed should be occupied with the same plant, so as to form masses of flowers, or with more than one if they are of

the same height and bloom together. A succession of different sorts may be in some instances obtained from the same bed—for example, annuals transplanted by bulbs, or between herbaceous perennials that grow upward and spread much laterally.

GREEN-HOUSE.—Most of the plants in pots may be removed to open air at the close of the month. Skill may be exercised in arranging and placing them up well together, and the pots should be kept clean and in neat condition. Many growing plants will need changing to larger pots, and those remaining in the green-house should be supplied with water, which in warm weather may be given in large quantities.

WORK FOR JUNE—KITCHEN GARDEN.—The chief points of attention during the month of June are the destruction of weeds. There is no necessity that a single weed should grow in a well managed garden—most gardeners being satisfied with destroying nineteen-twentieths, and leaving the twentieth to grow and ripen seed. It would be good policy to destroy all while at the good work. Constant tillage tends to preserve moisture in hot weather, and to accelerate the growth of plants. If labor is scarce, provide the very best tools—which at a very slight increased cost, may double the effective work of the gardener.

Fig. 256. Hoop training tomatoes.

A convenient, simple and economical support for tomatoes may be made of narrow hoops, varying from a foot to eighteen inches in diameter, and secured to three stakes about four feet high, placed as shown in fig. 256.

Plant for succession, peas, beans and sweet corn, and beets for winter crops. Set out celery and cabbage—the latter are effectually protected from the grub or cut-worm, by wrapping around the stem a small piece of writing paper, so that when set out the paper may extend an inch or so above and below the surface of the soil. Dip the roots in thin mud before setting out, and they will need no shading from the sun. Watch for insects as directed for May.

GOOSEBERRIES may be easily kept for winter use if picked while yet green and hard—if nearer ripening they will spoil. Fill bottles full with them, cork them up dry, and place them in a cool and quite dark cellar.

FLOWER GARDEN.—Get out dahlias and complete the transplanting of bedding plants and hardy annuals. Short-lived flowering annuals may be sown late. Continue to take up bulbs as the leaves become dry, remove off-sets if any, and when the surface is dry, remove and pack away; stake

tall flowers, stems, and cut away and clear off dead stalks. Removing the flower buds from roses as soon as they form, will cause them to give a later or second crop. Removing seed-vessels before ripe will prolong the flowering of other plants. Gather ripe seeds.

GREEN-HOUSE.—Give plenty of air—carry out all but the tenderest plants—insert cuttings for propagation—make layers—wash foliage—mulch pots in open ground with mowings of lawns, to retain moisture.

WORK FOR JULY—KITCHEN GARDEN.—Continue without intermission the hoeing and mellowing of the surface of the soil, and the destruction of weeds. Thin out crops where the plants crowd each other. The thinning of beets may be used on the table and constitute excellent greens. Watch for insects as before.

Save seeds as they ripen. Late crops of turnips may be sown before the close of the month. To prevent destruction by the turnip fly on adhesive soils, all the clods must be crushed, and the surface left even and mellow. Spreading old straw over the surface of such soil, burning it, and then sowing the turnips on the surface after a slight raking, ensures success.

FLOWER GARDEN.—Continue to keep the surface of beds mellow and smooth, and every part of the grounds in neat condition. Layers of shrubs and plants may be made in open ground, such as roses, honeysuckles, verbenas, etc. Continue the pinching-back process to give a neat form to shrubs and plants. Tie up plants to stakes where necessary. Gather and mark seeds as they ripen.

GREEN-HOUSE.—Follow the directions of last month. Shade plants during hot days. Shrubs in a growing state, from which the bark separates freely, may be now budded. Cuttings for winter blooming may be inserted. Shrubs should be pruned and pinched in to give them a proper shape. Clear away all rubbish and keep everything in finished order. Secure a good supply of earth, compost, and sand for potting.

WORK FOR AUGUST—KITCHEN GARDEN.—Continue to carry out the work of previous months in cultivating the ground, and keeping it clear of weeds, collect, put up carefully, and mark seeds as they ripen. Sow winter radish and late crops of turnips. Earth up celery. Thin the fruit on melons, and remove those particularly which will not probably ripen. Do the same with tomatoes. Potato tops, as the crop is dug, should be buried beneath the soil, and all ground rendered vacant by the removal of any crop, cleared of rubbish and kept perfectly clean, if not replanted.

FLOWER GARDEN.—See the directions for last month. Sow bulbous-rooted plants to obtain new sorts; set out bulbs during this or next month, or even later. Stake dahlias as they need it, and pinch into form and thin out imperfect flowers. Herbaceous perennials, which have ceased

flowering, and which often make a second growth in autumn, may be divided for increasing during the present dormant state.

GREEN-HOUSE.—Propagate succulent plants by slips, suckers, etc. Mellow the surface in pots and give fresh earth when needed. Bud oranges and lemons if the bark separates freely. Propagate pelargoniums by cuttings. Plants standing in pots dry more quickly than in beds, and if growing, should be therefore kept well watered. Procure peat, leaf-mould, sand, etc., for future use.

WORK FOR SEPTEMBER—KITCHEN GARDEN.—Continue cultivation to all growing crops. Sow lettuce and spinach for wintering over, protecting, in frames or with layers of evergreen boughs. Draining or trenching, if unfinished, should be completed. Continue earthing up celery. Save seeds of all crops as they ripen, selecting from the largest when magnitude is an object, and those first ripened when early maturity is sought, mark them plainly to prevent mistakes.

In preparing new gardens for next season's planting, or for enriching the soil of present ones, the sooner that manure is applied, and mixed with the earth, the more time will it have to become thoroughly infused in every part. The present month is, therefore, a suitable time to apply fresh or old manure or compost, whether left on the surface or turned under.

FLOWER GARDEN.—Set out bulbs—divide perennials—continue to keep the ground mellow and clean, and gather seeds. Dress and keep all parts of the ground in neat order. Lawns will require less frequent mowing than early in the season, but they should by no means be neglected, as a few straggling plants outstripping the rest, destroy the neatness of their appearance.

GREEN-HOUSE.—Give fresh earth and plenty of fresh air to plants which are returned under glass. See that all parts of the structure are in good repair, and that flues are ready for use. Transplant seedlings, cuttings, etc. Give less water as the weather becomes cooler and plants are retarded in growth. Before returning to the green-house, clean them of decayed leaves, and give them fresh earth.

WORK FOR OCTOBER—KITCHEN GARDEN.—Collecting and storing crops for winter will form an important part of the work for this month. All kinds of roots, such as potatoes, beets, carrots, etc., should be taken up without bruising, rendered perfectly clean, and the outside dried before carrying to the cellar. Those that will wilt in drying may be kept in a fresh condition, easily accessible, by packing them in neat boxes, imbedded in fine damp moss. This is much better than sand, both in being cleaner and easier to reach. Cabbage in the head may be packed away and kept fresh in the same way. Cauliflowers which have not headed, should be planted

closely together in a box of earth, and they will usually form good heads before spring. Clear away the dead stems from asparagus beds, and dress them with manure for winter. Manure ground which is not rich enough, by leaving it spread upon the surface till next spring, by which time the soluble parts will become finely diffused through the soil. Procure, and secure from freezing, a sufficient quantity of fine mould and sand for hot-beds next spring. Sow lettuce and spinach for spring use, as directed last month. The season of fresh tomatoes may be prolonged by covering them when night frosts are feared. if it be only with a sheet of muslin or a broad newspaper.

FLOWER GARDEN.—Clear away dead plants, stems and leaves, and keep the entire grounds in order. Finish setting out bulbs, hardy perennials and hardy shrubs. Peonies may be divided and set out. Rake up and save all scattered leaves and use them in compost heaps. In setting out hyacinth bulbs, place a handful of sand around each bulb, if the soil is clayey—which will tend to prevent rotting. Late in the month, cover them with a layer of leaves, or long manure, to be removed in spring.

GREEN-HOUSE.—Give air and fire heat, as both are respectively needed, and follow the directions of last month. Annual flower-seeds sown now will furnish a fine bloom in winter.

WORK FOR NOVEMBER—KITCHEN-GARDEN.—As the season is rapidly drawing to a close, finish the gathering of crops early in the month, as directed for October. Roots may be rapidly cleaned by means of a revolving octagonal box, as shown in fig. 257. Slits or openings an inch wide are left between the eight boards which form the eight sides. One of these sides runs in by sliding—by opening it, a half bushel or more of roots are thrown in, when a few revolutions of a crank knock off all the loose earth, which falls down through the openings. By using this cleaner, with the lower part running in water, roots are rapidly and perfectly washed

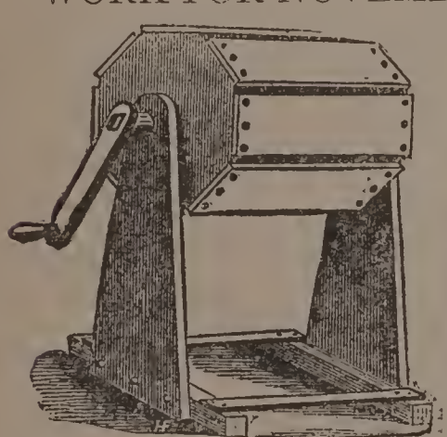


Fig. 257. Root Cleaner.

Winter dress asparagus beds, if not already done. Gather the heads of winter drumhead cabbage, and pack them in damp moss in boxes, as directed last month. Those which have not headed may be kept and headed during winter for spring use.

GREEN-HOUSE.—Plants recently removed from out-doors to the green-house, require more fresh air than afterwards, which should be admitted as far as practicable, according to the state of the weather. Moderate fire-heat should be applied when the weather is cold. A temperature of 45°

Fah. is quite high enough for all strictly green-house plants. As they grow but little they should be watered quite moderately.

FLOWER GARDEN.—Shelter, with a suitable covering of dry leaves, tender plants, such as auriculas and white day-lilies; also cover tender shrubs with evergreens. To prevent the settling of the leaves and smothering, first put on a layer of small evergreen boughs. Take up and secure dahlies. Finish planting hardy bulbs, if not completed, and set out hardy shrubs.

The following mode of obtaining a beautiful bloom of hyacinths for the parlor during winter is given by a skillful cultivator of this flower, preparations for which should be made early the present month: First procure a handsome table made for the purpose, of black walnut and turned legs, so as to be an ornament to the parlor, about four and a half feet long by two feet wide in the clear, so as to hold three rows of eight pots each, the pots being eight inches in diameter. The top of the table is to be like a box or trough, eight or ten inches deep, made light, and well coated with white lead paint inside, particularly at the joints. Into this table fit a zinc pan of the same depth, with wire handles turning down into the pan on each end. The table is then ready for the reception of the pots.

The pots are usually prepared towards the latter part of November, by taking eight inch soft baked pots and placing in the bottom about an inch of broken earthenware, charcoal or small pebbles, as may be most convenient. Then fill them to the top with a compost of equal parts of clean or washed sand, well-rotted cow-manure and loam. An admixture of bone or horn shavings, although not essential, gives increased size and brilliancy to the flower. A bulb is placed in the centre of each pot, just so deep that its top may be seen, pressing the soil around it and watering it thoroughly. The pots are then set in a warm, dark cellar, and watered to prevent drying up. In about a month the pots will be full of roots, but the plants will not have grown more than an inch. They are then (about the middle or latter part of November) placed in the pan, and the interstices filled with common wood moss, cover the tops of the pots smoothly with the handsomest green moss that can be found, through which the tops of the shoots will just be visible. Water copiously every morning through the fine rose of a watering pot on the moss. The water will collect in the bottom of the pan, and the roots finding their way out through the holes in the pots, will absorb it and grow rapidly. In a few weeks a beautiful dense bloom will be produced, the effect of which will be heightened by a tasteful intermixture of colors. A few narcessus, especially the polyanthus varieties, add much to the effect. The table should be placed in strongest light. As soon as a flower fades, it may be carefully lifted from the moss, the pot removed and a new one supplied from the cellar. The table may be of any size desired.

Fig. 258. Cutting.

Cuttings of shrubs should be cut with a small crown, as in fig. 258. They may be imbedded in sand, in dry trenches or pits (fig. 259,) covered with earth and then with a coat of manure.

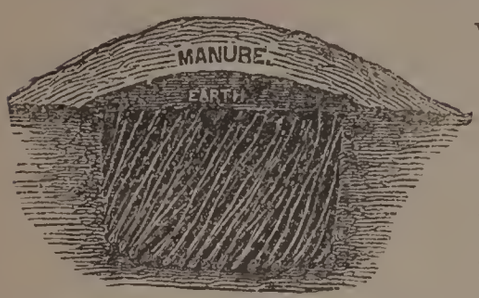


Fig. 259. KeepingCuttings in Winter.

Winter mulching of shrubs, for protection, should be applied towards the close of the month. (Fig. 260.) It should be spread broadly, or as far as the roots extend (*a*) and not merely at the foot of stem, as too often done, and as shown at (*b*) in the annexed cut.

Fig. 260. Winter mulching shrubs.

WORK FOR DECEMBER—Kitchen-garden.—The labors of open ground management have closed for the Northern States, but in the Southern States the directions for last month may still be followed. All stakes, sticks and tools should be carefully housed, and new ones made when required, on leisure days.

Flower garden.—The only remaining out-door work is protecting tender plants and shrubs, if not already done, according to the directions given for November. The preparation of manure, its application to the soil, procuring labels, tools, seeds, etc., as directed for January, may be commenced during the present month.

Hyacinths in water for blooming during winter, are prepared by first selecting good, hard bulbs, without side bulbs, placing them in glasses filled with rain water, and then setting them in a warm, dark closet, taking care that the water does not become foul or evaporate. Roots will be thrown out and partly fill the glass. Bring them out to strong light, as needed, and they will bloom in less than a month. A few drops of liquid ammonia will give a higher color to the flowers. The water should be changed once in ten days, taking care that the water which replaces the old should have the same temperature.

Green-house.—See directions for November. Give air as required. Keep the earth mellow in pots. Clear away dead leaves as they appear. A temperature of 35 to 40° Fah. is sufficient, but especial care should be taken that it does not run down to freezing point. The hardiest plants should be placed in the coolest parts of the house. If any should accidentally be touched with frost, water the whole plant, from a fine rose, with cold water. In severe weather apply mats, or close shutters.

ASPARAGUS—Culture of.—It is a very essential requisite to give asparagus plants plenty of room—this being more important than to make a

very deep and rich artificial bed for them. A writer in an Agricultural paper states that twenty-four years ago he set out a bed, in rows four feet apart, and cultivated like corn, by horse-power. All that it cost him to supply a table of twenty or more for two months, was less than the expense of a dozen messes of green peas. Any soil, he observes, fit for a premium crop of corn or potatoes, is fit for an asparagus bed, without any preparation. It is annually dressed with manure, in autumn, plowed and forked under in spring.

ARTICHOKE—Culture of.—The Artichoke may be grown from seed or offset suckers, separated in early spring. The best way to obtain a supply from seed is to sow the seed in April in a bed of good rich earth, or it may be planted in drills one inch deep and about twelve inches apart. It should be transplanted the following spring to a permanent place. Either in beds or drills, plants should stand two feet apart each way, requiring a deep, rich, moist loam; also should be protected with leaves or straw during the winter.

After the crop has been removed sheep are tethered on the land with long ropes (or turned loose if there are fences.) They eat off the young sprouts as fast as they appear, and the plant dies for want of the support which it can only receive from leaves. By the time the summer-fallow is to be broken up for the grain the Artichokes will have disappeared.

BEANS—Training lima.—Set two rows of posts four feet apart, and eight or ten feet apart in the rows; the posts six feet high above ground. These may be made of good chestnut rails, hewed to three inches square at the top. Twelve inches above the ground along the line of these posts, I nail a strip three inches wide, and another at the top of the posts of less width. Across, on the top of the posts, is nailed another strip to keep the posts firm; another strip forms a ridge pole, supported by small rafters, set at an angle of forty-five degrees from the top of the posts. To the lower strips is tied cord, sixteen inches apart; each cord is taken around the upper slat, and over the ridge, and secured on the opposite side in the same manner. It is designed to have but one plant to a cord. In this method of planting, more plants can stand on the same ground, and still be so divided as to be open to the air and light, and the result is a product nearly or quite double that which can be grown upon poles. If the frame is well set up it will last many years. It may be so made that it can be removed to different locations. When the posts are set on each side of a garden walk, a very neat, shady avenue is formed, with economy of room. This plan is not confined to Lima beans, but it is equally adapted to all the running varieties

W. A. Underhill, of Croton Point, North river, has adopted a mode of training the Lima bean, which is exhibited in the accompanying figure, and

Fig. 261.

which he thinks possesses some important advantages over the common mode of training on poles. A strong wire is stretched from the tops of posts placed at a distance from each other; and to this wire two diverging cords from each hill of beans are attached. This mode gives more complete exposure to air and sun, and affords larger crops, and has a neater and more finished appearance than the usual way of training.

BEANS—Culture of.—James A. McCollum, who has been very successful with this crop, gives the following directions by which he can raise beans at less cost than wheat, and with greater profit:—A warm, gravelly soil is the best, and if covered with a stiff sod so much the easier to keep free from weeds. Take pains in plowing it; see that every sod is turned over; roll with a heavy field roller; thoroughly harrow; then mark out your rows. For the medium bean I make the rows twenty-eight inches apart; for larger varieties thirty-two inches. I am particular to secure the best beans for seed, and all of the same variety, for it is very essential in securing the crop to have them ripen at the same time, and they sell better if they have a uniform appearance as to size, etc. Plant in drills with a bean planter. I use one that plants two rows at a time, putting on usually about five pecks of seed per acre, of the medium. Having finished planting, roll all down smoothly with a roller; it is of great benefit to the crop, especially if you have to cultivate to keep down the weeds. I use a common corn cultivator—one that is so constructed that you can shut it up close. Very often, on ground that is free from weeds, they never cultivate them, but I think in stirring the soil it will increase their growth more than enough to pay expenses. We consider the best time to plant usually from the first to the tenth of June, although I have seen them planted as late as the twenty-fifth, and yield a crop of twenty-five bushels per acre.

CARROTS—Succession in.—In some pats of Massachusetts, four or five successive crops of carrots are taken from the same land, without a diminished product. All crops must exhaust land more or less, unless a part or all is left on the land; but in this instance, it appears that the annual manuring imparted more fertility than the crop took away.

CELERY—Securing.—For common family use, it is best to let it remain where it grew and to cover it. It is difficult to take it up without more or less injury. To facilitate covering, dig a pretty deep trench for it to grow in—let it be in a sheltered place where the winds will not sweep off the covering, nor cause deep freezing. It must be covered deep, as freezing will spoil the celery. There are three materials for covering—fresh manure (which may be used for other purposes when spring arrives) saw-

dust, and forest leaves. The latter are best, but need some protection on each side (for instance, a row of pea brush stuck into the ground) and a covering to hold them from blowing away. Where the subsoil is not fertile, the trench in which the celery is set, should be three feet wide, and three or four inches of old manure spaded and well mixed in before the celery plants are set out, in order that the roots may have a good chance to grow. If a stream of water could be occasionally turned into this trench, to fill it a few inches, it would accelerate the growth.

CUCUMBERS, MELONS, ETC.—PROTECTING.—After trying various modes for protecting melons and cucumbers from the striped bug and other insects, we find the following superior to any other. Two small twigs of osier or other slender wood, about a foot and a half or two feet long, are bent over the hill of young plants, and the ends thrust into the ground, as shown in fig. 262. A newspaper is then placed upon these curved sticks covering the whole, and the edges are fastened down all around by a covering of earth as shown in fig. 263. This constitutes the whole contrivance, and affords complete protection from all insects; the paper being thin and porous, admits a sufficient supply of air and light, at the same time sheltering from cold winds. Plants thus protected have grown twice as fast as those fully exposed. Another advantage of this mode is the protection it affords from night frosts, rendering it admirably adapted to plants which have been early removed from the hot-bed. Lastly and not least, is its cheapness. A gardener will apply it to a dozen hills in as many minutes by the watch, the material costing nothing to any one who takes a political newspaper.

Fig. 262.

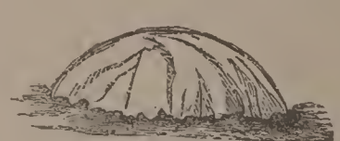


Fig. 263.

Unless the paper is very thin and fragile, heavy rains will not break it. Strong plants sometimes burst through; but a better way, when they become large, is to tear a hole in the top, as shown in fig. 264, the remaining paper at the sides still affording some protection, although plants of this size are usually safe from injury.

Fig. 264.

CABBAGES—HEADING DURING WINTER.—It often happens that many cabbages have not formed heads during autumn on the approach of winter, and these are usually rejected and thrown aside. The mode we have adopted to produce heads from these has been long known to some of our readers, but we discover that it is rarely practiced. A brief description may therefore be useful: Take up all these plants, and set them as closely as they will stand, in a double row, in their natural position in a wide and shallow

trench. Form an earth roof over them, in the following manner: Set in a piece of upright plank at each end to support the ridge pole (shown by the dotted lines in the figure.) Place a rail or stiff pole on these for the ridge pole, and on this the ends of short pieces of board in the form of a roof.

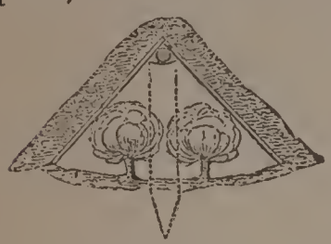


Fig. 265.

Cover these boards with about six inches of earth, or enough to keep the soil from freezing in which the cabbages stand. This is the whole operation. Nearly all of these will be handsomely headed by spring, and being entirely excluded from light, they will be more delicate both in appearance and flavor, than common cabbage heads. Two hours labor last autumn gave us a fine supply of cabbages for a moderate family nearly through the whole spring.

Failure has sometimes resulted by not covering the roof with sufficient earth to keep out severe cold. About six inches does well for the Northern States. A sheltered place is best. We have allowed a very small ventilation at the ends, but have not experimented with a view to find how much is best.

GARDENS—Late in summer.—Farmers who raise kitchen vegetables, and who do not keep a regular gardener, are apt to neglect their grounds toward the end of summer and early in autumn, and allow weeds to ripen their seeds. Nothing reduces the current expenses of a family, for the outlay, more than a good kitchen garden; but the complaint with many is the labor of keeping it clean—the constant fight with weeds, weeds! Some have adopted the opinion that a quarter-acre garden will grow more weeds than ten acres of farm land, as some are managed. A few weeds, allowed to perfect seeds, will produce an abundant crop next year; and thus, year after year, the earth becomes filled with them, till the soil of a garden consists of three main ingredients, namely, a soil, naturally; a large amount of manure, artificially; and an immense supply of foul seeds, spontaneously. Is it not practicable to clear out entirely and totally the last of the three? Are weeds a necessity? If a garden contains a hundred thousand of them, and ninety-nine thousand are killed by the hoe, why not the remaining thousand? If nine hundred and ninety of this thousand, why not the remaining ten? The soil of a garden may be completely purified of weeds and their seeds, greatly reducing the labor of keeping it in order, and largely contributing to a fine growth of the crops. It is easier to keep a garden perfectly clean than to be engaged in a constant warfare with the weeds. The labor is far less. The reason that it is not done, is the want of care and attention. Nearly all farmers are satisfied if a garden is nearly clean. This is the origin of all the trouble—namely, leaving a few weeds to seed the whole ground. The remedy is—eradicate everything, and then in three

days go over again and eradicate anything that may have shown its head, and so continue the examination every week, weeds or no weeds; and after they are out continue the process to keep them out. A half hour in the morning, once a week, will do this effectually.

GARDEN—SEED, QUANTITY TO PLANT.—The following is an interesting chapter for farmers and can be relied on:

ASPARAGUS.—One ounce produces 1,000 plants; requires a seed-bed of about 12 feet.

ASPARAGUS ROOTS.—1,000 plants bed 4 feet wide and 225 feet long.

BEANS.—One quart plants from 100 to 150 feet of row, or 150 to 200 hills.

BEETS.—One ounce plants 150 feet of row.

BROCCOLI.—One ounce gives 2,500 or 3,000 plants; requiring 40 square feet of ground.

BRUSSEL SPROUTS.—Same as broccoli.

CABBAGE.—Early sorts, the same as broccoli; the latter requires 60 feet of ground.

CAULIFLOWER.—The same as late cabbage.

CARROT.—Three or four pounds to the acre; one ounce to 150 feet of row.

CELERY.—One ounce gives 7,000 or 8,000 plants; requiring 80 feet of ground.

CUCUMBER.—One ounce for 150 hills.

CRESS.—One ounce sows beds 16 feet square.

EGG-PLANT.—One ounce gives 2,000 plants.

ENDIVE.—One ounce gives 3,500 plants; requiring 80 feet of ground

KALE.—Same as Broccoli.

LEEK.—One ounce gives 2,000 plants; requiring 60 feet of ground.

LETTUCE.—One ounce gives 7,000 plants; requiring seed beds of 120 feet.

MELONS.—One ounce for 120 hills.

NASTURTIONS.—One ounce sows 25 feet of row.

ONIONS.—Four or five pounds to the acre; one ounce sows 200 feet of row.

OKRA.—One ounce sows 200 feet of row.

PARSLEY.—One ounce sows 200 feet of row.

PARSNIPS.—One ounce sows 250 feet of row.

PEPPERS —One ounce gives 2,500 plants.

PEAS.—One quart of smaller sorts sows 120 feet of row; of larger, 200 feet of row.

RADISH.—One ounce to 150 feet of row.

SALSIFY.—One ounce to 150 feet of row

SPINACH.—One ounce to 200 feet of row.

SQUASH.—One ounce to 75 hills.

TOMATO.—One ounce gives 2,500 plants; requiring seed bed of 80 feet.

TURNIP.—One and a half pounds to the acre; one ounce to 2,000 feet.

WATERMELON.—One ounce to 50 hills.

GARDENS—COMPOST FOR.—Principal ingredients—stable manure, more or less, and turf from fence corners; these laid in alternate layers, a few inches thick, and occasionally added as other materials increase. Auxiliary ingredients—weeds, litter, rakings of leaves, potato tops, wood and coal ashes, soapsuds, dish-water, refuse hair, dust from house sweeping, chicken and fish bones, gutter scrapings and nearly every thing else that would be "dirt" elsewhere. Rotted a year in a heap, and these ingredients will form a valuable compost to the benefit and neatness of the premises.

KITCHEN SLOPS AND TOMATOES.—N. K. Meriam, of Grafton Station, Mass., has adopted a simple and cheap expedient for growing early tomatoes and disposing of the slops from the kitchen at one operation. The kitchen yard is in a warm, sheltered place, with a southern exposure. Barrels are placed near the wall, nearly filled with rich earth. In these, tomato plants are placed early in the season, and may be easily covered up on cold nights. As the plants grow and increase in foliage, and thus throw off large quantities of moisture, the kitchen slops are poured into the barrels, for watering the plants. The warmth, moisture and elements of fertility thus supplied, produce an early growth; while the confinement of the roots in the barrel prevents too much running to stem at the expense of fruit. The barrels should not be water tight, but admit of drainage. Any number of barrels may be thus placed in a row, and be planted with cucumbers and other vegetables. If properly trained, they present a neat and ornamental appearance, and the barrels serve as reservoirs, to get rid of kitchen slops, so often a nuisance about kitchen doors.

Fig. 267.—Pansey.

Fig. 268.—Digitalis or Foxglove.

Fig. 269.—Silium Auratum.

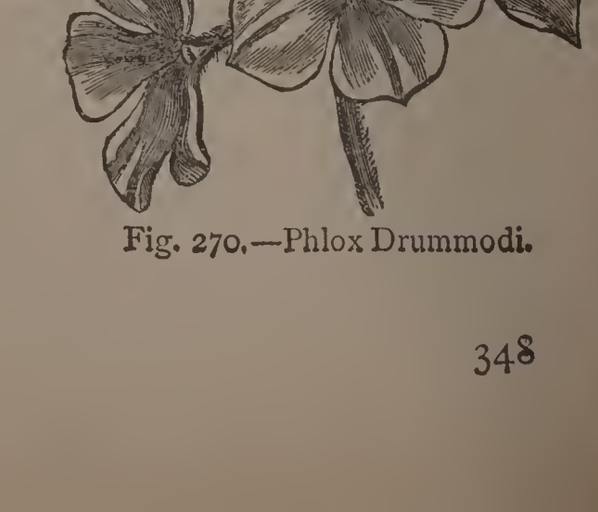


Fig. 270.—Phlox Drummodi.

FLORICULTURE.

HINTS FOR EACH MONTH—JANUARY AND FEBRUARY.—Prune all your ornamental shrubs that require pruning, removing carefully all broken, decayed, and ill-formed parts, taking care to give the best possible form to their heads, so that none of the fine effect, whether in blossoms or foliage, may be lost.

If any such plants as crocuses, snow-drops, the ranuncula, tulip, jonquil, and bulbous plants in general, are left out of the ground, they may now be planted for late flowering. If you wish to increase the numbers of such plants as the snow-drop or crocus, take them up only once in two years, but they should not be left longer.

MARCH.—The hardy kinds of annual flower seeds may be sown in the garden borders, if the weather be warm and dry. Larkspur, Venus' looking-glass, candy-tuft, catch-fly, sweet pea, lavatera, hawk-weed, and other hardy species, will flower much better than if sown at a later period. They should be sown where they are intended to flower, whether in beds, borders, or pots.

The ground having been well mellowed, finely broken, and leveled, open small patches with a trowel, about six inches in width, at moderate distances. Draw a little of the earth from the top to one side, and sow the seed, each sort in separate patches, and in such forms and groups as will produce the most agreeable effect of color. Small seeds should be covered about a quarter of an inch deep; the larger in proportion to their size.

Peas should be covered at least an inch in depth. Hardy fibrous-rooted perennials may also be planted, if the weather be warm and the ground dry. In planting, remember to leave the larger sorts room for growth; or if planted too thick, they should be properly thinned out, after they have been up long enough to determine which may be selected as likely to form the finest and healthiest plants. Double chamomile, phlox, lobelia, scarlet-lychnis, Canterbury bell, London pride, fox-glove, hollyhocks, and many others, should be sown this month. In planting, you should have a care that in every part there should be a regular succession of flowers, so that no place, during the whole flowering season, will ever be left entirely without them.

Remove all litter from the walks and beds. Loosen the earth of the beds with a hoe, and rake them carefully. Finish pruning the hardy shrubs, and roll the gravel walks and lawns with a roller, to settle earth which has been swollen by the frost. Sow the ten-week stock and mignonette in warm sunny borders.

APRIL.—Pinks should be planted in a good, fresh, pulverized, loamy soil, about nine inches apart; and the bed should have a convex or rounding surface, to shed the rain. Pinks should be planted in September or October, and in the same ground where they are intended to bloom; but if not planted in autumn, now is the time. They may now also be propagated by a division of the roots. These beautiful, fragrant, and easily cultivated flowers, are generally favorites, and they make most lovely borders. Flowering shrubs and ornamental trees may be set out during this month.

MAY.—Sow all the flower-seeds which may yet be left out of the ground; hoe and rake the borders; transplant perennials, and finish pruning shrubs and evergreens. When tulips begin to blossom, they should be shaded from the sun; for a considerable degree of heat causes the colors to intermingle, and often greatly injures their beauty; and the same is true of hyacinths, which should never be kept in a hot sun. They should not, however, be so shaded as to exclude the light, or the colors will faint. Neither hyacinths nor tulips require artificial watering, even in the driest seasons; still the early rains, if moderate, contribute to enrich the bloom; but after flowering, too much wet injures the roots. The stems of both tulips and hyacinths should be supported by tying them loosely with strings of green worsted or painted sticks placed behind them. Plant dahlias early in May.

JUNE.—After tulip and hyacinths have done flowering, let them remain until the foliage begins to turn yellow, only taking care to shield them from heavy rains. When kept thus about six weeks, it will generally be time to remove them. Take up the roots carefully, lay them in a dry, shady place, taking care to distinguish the most important varieties. They may, when quite dry, be packed in well-dried sand, barley-chaff, or saw-dust. Each root should be rolled in a separate paper. Also all the early flowering bulbs should be taken up as soon as they have completely done flowering, and the leaves decay; and the finest bulbs may either be planted out again, or preserved the same way as hyacinths.

The first week in this month is, in the Northern States, the best time for planting the tube-rose; but in the Middle States this should be done a month earlier.

Scarlet lychnis, wall-flowers, and stock gilly-flowers may now be propagated by the young slips of the present year. Let the young stalks of the lychnis be cut into lengths of six or seven inches, and planted in a shady

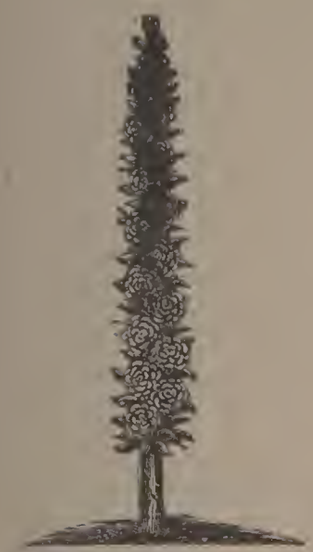


Fig. 271.—Balsam, Single Stem.

Fig. 272.—Double Hollyhock.

Fig. 273.—Rocket Lockspur.

Fig. 274.—Chrysanthemum.

Fig. 275.—Large Flowering German, ten weeks stock.

border of rich, light earth, with one or two joints of each cutting above ground. Close the earth well around them; water moderately, and if hand-glasses are placed over them it will facilitate their rooting.

Wall-flowers and stock gilly-flowers should be propagated from the shortest and stoutest slips. Let them be from four to six inches long, and carefully cut from the mother plants. Plant either in pots, or in a shady border, inserting in the ground up to their leaves. Give them a little water, shelter from the mid-day sun until they are rooted, and water occasionally during summer. In the same way phloxes and other fibrous-rooted plants may be propagated.

Be very careful to keep the beds and borders free from weeds, and especially those where young seedlings are growing.

JULY.—Transplant all the latter kind of annuals that will bear, and may require it, such as French and African marigolds, China asters, chrysanthemums, the China pink, balsomime, amaranths, and various others.

Trim your box borders. Let this be done in moist weather, or they will dry and turn red. Cut them even at the top and sides. Box edgings should not be higher than three inches, nor broader than two.

Transplant the early-sown seedling biennials and perennials, such as sweet-williams, Monk's hood, rose camfrion, asters and coreopsis.

Keep the walks, borders and shrubberies very neatly. All weeds should be exterminated on their first appearance—in the open space with the hoe, and among the more closely-growing plants with the hand. This should be done in a dry day. Remove the weeds immediately.

Cut off all dry flowering stems of the early sorts; place sticks for the support, and tie up all that may require it. Leave the principal stems of such plants as you wish to obtain seed from, to ripen their seeds. Pick off all withered leaves, and remove decayed parts. Plant stock gilly-flowers and wall-flowers either where they may be sheltered by a garden frame, or in the open borders, from whence they may be removed in September, as they will not endure the frosts of the Northern and Middle States. Pay particular attention to watering. Let the water be sprinkled over the whole plant, for the pores of the leaves become choked by dust, and require the application of water hardly less than the roots. The evening is the best time for watering. Sensitive plants which have been raised in hot-beds, may be brought out into the open air and set in very warm places.

AUGUST.—This month the seeds of such bulbs as you wish to obtain varieties of may be sown, as the tulip, hyacinth, crown imperial, iris and lily. The seeds of these should be sown as soon as they ripen, in order to have them vegetate the following spring. If kept until that time, they will not vegetate until the next year. The early-flowering fibrous-rooted perennials

may also be propagated by suckers and divisions of the roots. Pick off all decayed leaves; plant in a shady border, and cover loosely with mats until rooted. They should be watered immediately, and this operation should be frequently repeated till they are well grown. The pink, sweet-william, primrose, daisy, phlox, violet, and many others may be propagated in this way.

Many native plants may also now be brought to the garden, and made to vie with its foreign beauties. If you meet in your walks with any flower you wish to secure, take it up with a ball of earth; cut off the flower-stems, if there be any; plant it immediately on bringing it home, observing to give shade and water for a time, especially to those having fibrous roots. Remember to place them as near as possible in situations resembling their natural habit. The next year they will open into full flower, and afterward they may be propagated, as other plants, in their season. In this way many of our native flowers, such as asters, gentiana, cassia, cyprepedium, sarracenia, iris, and others, may be made the finest ornaments of the garden; and they have always this advantage, that they are hardy and easy of culture.

Give water freely; clip hedges and box edgings; mow grass walks and lawns once a fortnight; sweep, dress, and roll the gravel walks, at least once a week; correct even the least disorder, and see that all is preserved in perfect neatness, order and beauty. The first week of this month all the autumnal flowering bulbs which you may yet have out of ground should be planted, such as the crocus, colchicum, narcissus, and amarylis, and also any spring-flowering bulbs that will not bear to be too long kept out of ground, as the red and white lily, iris, spring crocus, snowdrop, and crown imperial.

SEPTEMBER.—Transplant the layers of pinks and carnations, and also seedlings of the same plants, into such borders as you wish them to flower in, being careful to take up each with a ball of earth, and to water them when newly planted. Transplant perennial and biennial fibrous-rooted plants; plant out the spring-flowering bulbs. Plant tulip, narcissus, and hyacinth bulbs about four inches below the surface for a light and dry soil; but if it be hard and heavy, three inches will be enough.

Clip box edgings and hedges; and towards the end of this month dig the earth in the vacant beds, to prepare them for the reception of new plants. Make all necessary preparations for planting choice tulips, hyacinths, etc., both in the care of the grounds and in the manufacture of composts.

OCTOBER.—Prepare the ground and plant pinks, if this has not been done before. Select a fresh loamy soil. Let this be well pulverized, trenched about two feet deep and manured with a stratum of cow-dung

two years old and good sound earth, in equal parts. This stratum should be about six inches thick, and about four inches below the surface. Let the bed be raised higher than the surrounding surface, and the plants put out by the first week in this month. The bed should be kept free from weeds, and its surface stirred a little occasionally. It will need but a slight covering. Tulips should be planted by the middle or latter end of this month, and hyacinths from the beginning of October to the middle of November; and all spring flowering-bulbs should be planted now if not done before. You will also sow the seeds of bulbous and tuberous plants, transplant biennial and perennial roots, and pot such plants as will not bear the frost. Plant box and other plants for edging, and set and clip hedges. Evergreen hedges, as a general thing, however, succeed best in the spring; and so we have found do all evergreen trees and shrubs.

NOVEMBER.—Protect all bulbous roots that need protection. Take up tube-roses, and all tender bulbs that will not bear frost, and which lie dormant in winter; dry, and place them where they will be perfectly secure from frost. This month all kinds of hardy trees and shrubs may be transplanted, such as the common and Persian lilac, Judas tree, sassafras, magnolia, the lime, plane, walnut, elm, and maple trees, and the honey locust, oak, and tulip trees. Shrubs should be set out from three to five feet asunder, and trees from ten to fifteen feet. They may, however, be planted closer and afterwards thinned.

DECEMBER.—This month sow Anemone, Ranunculus, Polyanthus, Auricula, and Cyclamen seeds. These should be sown in frames similar to those used for cucumbers, and the glasses placed down immediately. Ranunculus and Anemone should be covered very lightly. The soil over them should not be covered to exceed one-tenth of an inch. Be careful to remove all earth-worms, as they are very destructive to young plants.

Continue to prune hardy trees and shrubs, and see that the newly-planted trees and shrubs have their roots well protected from the frost. This can be done by placing litter around the roots, and enveloping the whole plant in a wisp of straw, carried up and surrounding the stem, in the form of an inverted cone or sugar-loaf.

BOUQUETS—Preserving.—The *American Artisan* says that bouquets may be kept a month in continuous blooming (of course with a proper selection of continuous bloomers), by first sprinkling with fresh water, and then placing in water containing some soapsuds. Take them out each morning and lay them in fresh water a minute or two, and replace them. Change the soapsuds twice a week.

BULBS—In the house.—By the exercise of a little taste a world of pleasure can be derived from the cultivation of bulbs in the house, as they

can be used in almost innumerable ways. Hyacinth, narcissus and crocuses may be grown in glasses of water. Pot culture, for general use, however, is quite as good, and a little more natural. A very pretty arrangement is to plant a variety of bulbs in baskets or boxes. Fill the boxes with sandy soil, and if a little moss broken up finely is mixed with the soil, it will keep it from becoming packed or heavy from frequent watering. The box can then be planted with bulbs, always planting those that grow the highest in the center, and the low-growing kinds on the edges.

FLOWER-BEDS—Position of.—It often happens that two different flower-beds may be equally well managed and flourish alike, yet one may be a mass of brilliancy while the other exhibits little or no beauty. There are many flowers which always face the light of the sun; consequently the beds should be so placed that the spectator in the walk or window, should look them full in the face. That is, the strongest light and the position of the spectator should always be on the same side of the bed. This will be found particularly necessary with the pansy or tri-colored violet, and some others of the smaller flowering plants.

FLOWER POTS—In rooms.—Pots which contain ornamental plants in rooms, are often needlessly repulsive by the exposure of the earth in which they are planted. We have found a covering of an inch of white sand to prevent crusting the surface or soiling the edges of the pot, and at the same time allow free watering. A more ornamental appearance is effected by procuring from the woods the handsome flakes of fresh green moss, found in damp places or on rotten logs, and covering the earth in the pots neatly with one of these flakes. It serves as a mulch, keeps the earth moist and mellow, admits watering, and furnishes a neat green carpet under the plants.

FLOWERING—To prolong.—In order to prolong the flowering season in perpetual and other roses, and in annual and perennial plants, clip off with a pair of scissors the seed vessels, as soon as the petals fall. This prevents the exhaustion of the plants in the forming of seed, continues its vigor, and preserves a neater appearance of the whole plant, at the same time, the use of the scissors will enable the gardener to impart a symmetrical form to the plants.

HANGING-BASKETS—House plants and.—Oyster kegs and mackerel tubs, when painted green, do very well to plant house-plants in; and large cocoa-nut shells, cut in two and hung up with cord make respectable hanging-baskets.

LILIES—Propagation of.—The bulbs of lilies are made up of scales, sometimes amounting to nearly a hundred in a single plant, but usually much fewer in number. One-fourth or one-fifth of these may be broken

Fig. 276.—Pink tuft.

Fig. 277.—Flower of the Garden Pink.

Fig. 278.—Double Pink.

Fig. 279.—Group of Petunias.

Fig. 280.—Purple Candy tuft.

Fig. 281.—Camelia Flowered Balsam.

Fig 282.—Carnation.

off from the outside without injury to the bulb. The minute latent bulb at the base of each scale may be made, by proper treatment, to develop into a new bulb. If these scales are placed into a light sandy compost, in an upright position, a little beneath the surface, in pots or boxes, with the soil pressed compactly about them, in a greenhouse or warm place in the dwelling, and kept moderately watered, they will in the course of a month or two form small bulbs. The best time for this work is during the latter part of winter. When warm weather arrives in May these pots or boxes may be sunk in open ground without disturbing the new bulbs. On the arrival of winter, cover the whole with three or four inches of leaves. In the spring they may be planted separately, and in a year or two will make flowering bulbs. This is substantially the process adopted by Peter Henderson and other florists for propagating by scales.

A simpler mode is to take up the roots in autumn, and pack them close in a bed, covering with a few inches of leaves. Take them up in the spring, and remove the small bulbs surrounding the stem and imbedded in the mass of fibres; plant them and they will soon form good bulbs for flowering. This is the easiest and simplest way to increase lilies.

HOUSE-PLANTS—Hints about.—The best temperature for house-plants is from 48 degrees at night to 70 degrees during the day. Give air on every warm, sunny day. If your plants should at any time get nipped with frost, shower them with very cold water, and keep them in the shade for a day or two. Furnace heat is the worst for plants, and that from a wood stove the best. Keep the air moist—a pan of water kept on the stove, or a damp towel hung on the register, will do this.

Water thoroughly, but not too often. Shower all smooth-leaved plants frequently. Wash the leaves of English ivy with clean cold water and a sponge—nothing else. Use water of the same temperature as the room. The oleander, calla and hydrangea may have water standing in the saucers under the pot. Vines should be watered more frequently than other plants.

A few drops of ammonia added to a pail of water, and applied once a week, will prevent the earth in the pots from getting sour. In giving liquid manure, a heaping tablespoonful stirred into a pail of water is enough. To kill the green fly or plant louse—smoke the plants with tobacco Very weak lime-water will kill worms in the pots. Red spiders may be gotten rid of by frequently wetting the foliage and keeping the atmosphere moist. A pinch of flour of sulphur, sprinkled now and then on the leaves, will keep off mildew. If the scaly-bug attacks your callas, oleanders, and the stems of your rose bushes, exercise your patience by picking off the insects, and wash the affected parts afterwards with weak

soapsuds. The mealy-bug, which looks like little more than a bit of dirt, must, like the scaly-bug, be removed by hand-picking.

PLANTS IN ROOMS.—Those who have experienced the hardships of cultivating green-house plants in rooms, will appreciate a few words on the subject. They have met drawbacks, one of which is the dryness of the air, and another, liability to become coated with dust. The first is greatly increased by the heat of the stove, and there seems to the experimentive party no way to overcome these obstructions. But few plants live, as but few plants will endure for a long time in a common living-room. To obviate these difficulties, the Ward case has been constructed, and consists essentially in covering the plants with glass; of course this protects them from dust, at the same time confines the moisture which is constantly exhaled by the leaves, gives them a humid atmosphere. It also, in a measure, equalizes the temperature, and shields the plants from sudden changes which often occur in rooms. These reasons are sufficient to diminish the care of plants, and make their success more sure.

Fig. 288.

Fig. 288 represents the section of a small and simple case—made by covering a cast-iron vase of plants with a large bell-glass. Fig. 289 is a cast-iron basket of plants, without glass cover.

Fig. 289.

A simple and cheap form of construction is fig. 291, which is made of wood and covered with window sash. If well constructed and kept neatly, it makes quite an ornament. If kept in a room subject to occasional cold below freezing, the proper temperature may be maintained by the following simple and cheap contrivance: Place the pots on an iron or copper tray (the pots being supported, if heavy, by iron bars) beneath which is soldered a convex round piece of sheet copper, so as to form a flat boiler beneath the tray. A tube through the tray above admits filling the boiler and allows the escape of the steam; a small tube and cock below allows the water to be drawn off. A lamp placed under the boiler, heats the water, and by this means, the plants are kept sufficiently warm.

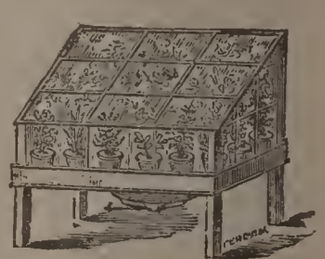


Fig. 291.

ROSE CUTTINGS.—One of the best methods of securing the success of these, is to stick the cutting about an inch deep into *clean* river sand—with properly prepared soil about an inch below to receive the roots as soon as they strike. The clean sand prevents the roots from rotting. A cor-

respondent of the *Horticulturist* succeeded with this when every other mode failed, and says he does not lose one in twenty.

AQUARIUM.—(Fig. 292.) An interesting ornament for a library or cabinet, is a water-tight glass case, supplied with water plants and fish. The water plants alone will not flourish, and the water becomes coated with green slime; but the addition of minute shell-fish and other small aquatic animals, renders the water clear, and each causes the other to thrive. Some skill and experience are necessary to adjust the proper number or quantity of each, for their best success.

Fig. 292

TRELLIS FOR FLOWER POTS.—A neat trellis for flower pots contributes to the neat appearance and to the ornamental effect of the plants. The accompanying cut represents a form manufactured of reeds instead of wire, being lighter, equally durable, and retaining the shape better. They are usually painted green, but perhaps a rich brown would appear better for many plants. Fig. 293 has a 30-inch stick, is 10 inches wide. Fig. 294 has a 24-inch stick and is 14 inches wide. Fig. 295 is taller, and is suitable for placing near the centre of a group of pots. The stick is $3\frac{1}{2}$ feet high, and 14 inches wide. These supports are sold at from thirty to sixty cents each.

Figs. 294, 295, 293.

HUNTING AND FISHING. [Prepared for the Every-Day Cyclopedia.]

Hunting and Fishing.

BIRD LIME.—1. The middle bark of the holly, any quantity; boil it for seven or eight hours in water, or until it is soft and tender, then drain the water off, and place it in pits under ground, surrounded with stones; let it remain to ferment, and water it if required until it passes into a mucilaginous state. Then pound it well and wash it in several waters, next leave it for four or five days to ferment and purify itself.

2. Linseed oil boiled and burned down to a thick varnish answers even better than the above. In preparing it the oil is put into an iron kettle and set upon a fire, when warm it is lighted also and allowed to burn until it is of the desired thickness. The iron pot should not be over one-third full of oil, and should have a lid to fit pretty closely by which the oil can be quenched at will. From time to time this must be done to ascertain the condition of the oil. It takes from nine to ten hours to boil it down, and when done it should be put away in a vessel as nearly air-tight as possible, otherwise it will continue to grow thicker and thicker until it becomes unusable. It should be of the consistency of thick syrup.

BIRD LIME—How to use.—There are various methods of using it. It can be either employed on sticks made for the purpose, by which means there is not so much loss of bird lime, or plastered on spots to which the birds are accustomed to come. If used in the former way, holes must be bored into the tree in which to fix the limed sticks. Birds taken with lime should be relieved as soon as caught, or they will flutter themselves to death. Alcohol will wash off the lime. But take care in applying it; small birds can be killed with the smell of alcohol. If their heads are not limed, cover that part of them with a silk handkerchief and use a sponge to wash off the lime.

FOXES—To trap.—The trap should be well smeared with blood, or beeswax, to destroy the odor of the iron. Set it in soft earth, packing moss or leaves around the pans and jaws. Bait with fried meat. The trap should be a small-sized double-spring, and should be fastened to a clog, light enough for the fox to drag, but heavy enough so that he cannot get too far away; though if there is snow on the ground, there will be no difficulty in finding him if he goes some distance. He may be caught the first

night, but more likely than not will dig out your trap, and you will have to try several times before you are smart enough to catch him.

GOPHER TRAP—How to make.—Take a hard piece of wood, about nine inches long, and turn it so that one end will be two and a half inches in diameter, and the other end three inches, gradually sloping from one end to the other. With a two-inch auger bore a hole in the small end eight inches deep. Then take a fine-toothed rip saw and split it open from end to end in two equal parts. In one of these halves a spring door is fixed, made of sheet-iron, which is round like the opening and curved to fit down in the half. This is made fast on a hinge near the entrance, with a spring under it sufficient to raise it to a perpendicular, the hinge so arranged that it can only be raised to a perpendicular. Another piece of sheet-iron, made round to move easily in the two-inch opening, is made which is attached to a long, narrow strip of iron, which strip moves easily under two staples in the bottom of the half to which the door is fastened.

In order to set the trap the door is pressed down, and the end of this strip projects over it and thus holds the door open. Then take the two halves and put them together, and slip over them a thin wide ring, made sloping like the trap, and it is ready for use.

With this trap you go out where the gopher is at work, and find his last made hillock, and if it is not quite finished, all you have to do is to stick the trap in the hole, open end downward, and in a short time he will bring up his load of dirt, and, in pressing against the upper piece of iron, he will push the strip of iron from over the door, when the spring will lift it up and shut him in.

GOPHERS—To trap.—Go where they work; find the last mound made; open the hole, set in a common spring trap, cover with a little light sand; leave the hole open. The gopher will come to close the hole, and get trapped.

MINK—To trap.—For mink the trap should be set near some stream. If their holes cannot be found make one. Set the trap in the cavity, three sides of which should be barricaded with stones, bark or any equivalent substance. Place the bait at the farther extremity of the cavity, beyond the trap. Bait with any kind of fresh meat; muskrat meat is good, but fish, either fresh or stale, is better. Bait should be smoked in cold weather to give it a stronger smell. The best scent for attracting mink is prepared from the decomposition of minnows, eels or trout. Cut the fish into small pieces; put into a bottle, cork loosely, and let it hang in the sunshine two or three weeks in the summer. A few drops of this on the bait, or on a stick near the trap, will draw mink a long distance.

MOLES—To destroy.—There are several mole traps in market that

work well, provided the moles can be induced to go where they will be caught. In addition to the traps, set men to watching the moles during light showers in summer, at which time they are more active, and when one is found moving he is to be dug out and killed. More moles have been caught in this way than with all the traps used. Poisons of various kinds have been recommended, but on trial they have proved worthless.

MUSKRATS.—HOME-MADE TRAPS FOR.—A trap, equal, if not better than a steel trap, is an old barrel. Sink it near the bank of the ditch, where there are evidences of the presence of the animals, to the level of the ground, and half fill it with water. Put in a couple of shingles, or light strips of boards, to float on the water. Place sweet apples or carrots, cut in small bits, in the runs of the muskrats, and toll them to the barrel. Put several pieces upon the floats inside. The rats will jump in after their food, and will not be able to get out. Where there are plenty, several muskrats may be taken in a night by this simple trap. It costs nothing but labor, can be visited at one's convenience, and there is plenty of room in it for a dozen or more at once.

MUSKRATS—TO CATCH WITHOUT TRAPS.—It is a mystery to many how muskrats, beavers, and other animals, are able to stay so long under water, apparently without breathing, especially in winter. The way they manage is, they take in a good breath at starting, and then remain under water as long as possible. They then rise up to the ice and breathe out the air in their lungs, which remains in a bubble against the lower part of the ice. The water near the ice is highly charged with oxygen, which it readily imparts to the air breathed out. After a time, this air is taken back in the lungs, and the animal again goes under the water, repeating this process from time to time. In this way, they can travel almost any distance, and live almost any time under the ice. The hunter takes advantage of this habit of the muskrat in the following manner: When the marshes and ponds where the muskrat abounds are first frozen over, and the ice is thin and clear, on striking into their houses with his hatchet, for the purpose of setting his trap, he frequently sees a whole family plunge into the water and swim away under the ice. Following one for some distance, he sees him come up to recover his breath, in the manner above described. After the animal has breathed against the ice, and before he has time to take his bubble in again, the hunter strikes with his hatchet directly over him, and drives him away from his breath. In this case he drowns in swimming a few rods, and the hunter, cutting a hole in the ice, takes him out.

OPOSSUMS—TRAPS FOR.—The traps for opossums are the same as for rabbits.

QUAILS—TRAPS FOR.—You can use any kind of a coop, supported by a figure 4. Sprinkle straw and grain under the coop, especially if snow is on the ground; the inviting appearance of the same will induce the birds to go under the coop, and in running about they will strike the spindle of the figure which lets the trap down, effectually cooping all that are under it at the time.

PRAIRIE HENS—TRAPS FOR.– Same as for quails.

RABBITS—TO TRAP.—Take brass wire and make a noose sufficiently large for the rabbit to get his head therein; then trim a small tree near their path, fasten the wire to the top, bend over and fasten by a notch to a peg driven in the ground; then make a fence or wall of fine brush a little across their path, leaving a hole to hang the wire in. Some use a strong cord instead of wire, but that is liable to break. Some also use box-traps, baited with sweet apple or onion, and we think the last to be the best. Some also use a steel trap, laid in the road and fastened.

RACCOONS—TO CATCH.—The best, and we might say the surest way to catch a raccoon, is with a good cur dog, one that knows how to keep quiet while on the track, but will bark at the tree. But if you wish to trap them with a steel trap, go to a swamp, and, after finding an old log, set your trap on the log, and then find two old limbs, and place one on each side of the log over the trap, crossing at the top in the form of an X, so that the coon in crossing the log will be compelled to go under them and over the trap. Bait the trap, if you choose, with frogs or chicken. But whether you bait or not, the coon is sure to "run" the old log, if he comes in the neighborhood. On the same plan you can set a dead-fall.

SKUNKS—TO TRAP.—Get an old barrel and place it on the side of a triangular stick of wood, about six inches high, fastening the bait on the bottom of the barrel. When the skunk goes for the bait, as soon as he passes the centre, the barrel turns up with the skunk, without any scent. Then take it by the tail and do with it as you please. Great care must be taken in placing the barrel, that it will not be too high, as it might throw over, and not remain upright. The more skunks you catch in the same barrel, the better the trap.

SNARES.—Snares are not very certain, but they are little trouble to make. They must be set in the paths or runs of the birds it is intended to take. They are of horse hair or thin copper wire tied in a running knot. The tendency of every bird when it finds itself touched about the head is to push forward. This draws the knot tighter until the bird kills itself.

SNIPES—TO SHOOT.—The first sight is the best. Not a moment should be lost in hesitating after you have drawn a sight, but pull the trigger at once. In cross-shots, fire well before your bird. Differing from the usual

practice, you should always walk down wind; the cause for this is, that the snipe always rises against it. If there is much wind, your only chance is, to "down with them" as soon as they rise from the ground.

SQUIRRELS—To TRAP.—To trap squirrels, place a steel trap on the upper rail of a fence where they usually frequent; set a pole with an ear of corn, or some other squirrel food, fastened on the end thereof, up against the fence, leaving it in such a position as to spring the bait over the trap at the height of six or eight inches; when the squirrel reaches to get the bait he will get into the trap.

TRAP—FOR MINK, WEASELS, SKUNKS, ETC.—Take boards one-half inch thick, and take a box the two sides and top twelve inches long, with one end closed; the size of the box inside being four inches square. A steel spring is fastened in the closed end of the box, to which is fastened a square ring at its extremity, through which the game thrusts its head to reach the bait at one end of a catch, which holds the ring depressed and held by a wire running from the front end of the trap to the catch on the upper extremity of the bait hook. One who has tried it extensively says: "This is the best trap for skunks in the world, I believe. I have used many different kinds, but none work so well as this." You can put it at the hole in a wall or fence.

TRAP—DEAD FALL.—The simplest dead fall is made with one log, heavy enough to hold any creature which it is proposed to trap. Cut a knotch into a stump, or drive a short stake with a knotch in it, or fasten the log with a withe to a stake or sapling, or in any case allow it a hinge-like motion. This is done with the log lying on the ground. Raise one end and support it upon the figure four, baited of course (see discription hereafter). The bait stick of the figure four must be at right angles with the log, and enclosed with stakes or otherwise to allow the animal to approach only from one side, and obliging it to land across the line in which the log would fall. Another way is to arrange two logs, one to fall on the other in the same way. Stakes may be driven at the side, if found necessary, to insure one log falling on the top of the other.

TRAPS—SETTING.—The first thing to secure in setting your trap, is that the animal will go to it; second, that it shall catch him when he comes; and last that he shall not be able to get away when once caught. Next it is necessary always to smoke the trap in burning hemlock, cedar or juniper boughs, dipped in the blood of pigs that have just been killed, or letting the blood of a chicken run over it, dipping it in melted fat or rubbing it while warm with a ball of bees-wax. But remember that in baiting a rabbit trap your hands must never be greasy; there is nothing a rabbit will so quickly avoid as grease of any kind.

Now having arranged this, your next business must be to induce your animal not to be shy. If you are carrying on trapping in wild woods the surrounding scenery is generally wild enough, but near at home, on the farm, care must be taken to take away the appearance of preparation, and yet preparation must be made. A cautious animal, such as a fox or raccoon, should be invited to come several times before the trap is set; arrange a place with sawdust, hay-seed, chaff, and chicken feathers, several inches deep, scatter through it food adapted to the animal intended to be caught, offal of chickens, bones, and bits of waste meat, fish heads, etc., if for fox; nubbins of corn, etc., for coon, leave it and when you have certain indications, set your trap (free from the iron smell) and cover with the material you have used, scattering bits of food therein as before, the creature you are after, will probably be there the next morning, if you have properly secured your trap. Another way is to set your trap under water two or three inches with the bait above it, hung upon a sapling or spile so as to make the animal stand upon the trap to get it, or to plant your trap well covered at the foot of an old stump, by the side of a sapling, by the side of a barn, hay-stack, smoke-house, pig pen, but always covering the trap and hanging the bait above it, so as to make the animal step into it.

Last of all, you must secure the trap by a weight of wood or metal, by a bent sapling that pulls it up into the air, or by a weight or stick that will pull it into the water and drown the game. A short light chain ought to be attached to every trap of iron, as animals gnaw with ease through anything like rope or hide. If you are catching animals only to get rid of a nuisance, the spring is necessary, but if for fur, you want to hoist the land animals into the air where they cannot damage themselves, and if water animals, you want to drown them quickly; the former result is attained by bending over a sapling with a stout cord attached, containing the bait, a portion of the cord continues down to the trap and is fastened slightly by a notched peg driven into the ground; when the animal is caught its struggles free the cord, and the sapling springs back and hoists it into the air. If your trap is set in water it may be fastened by a ring at the end of the chain to a pole running out into deep water, the pole should be fastened into its position and securely anchored, or the whole thing may be rolled far down the stream when you come to look for it; the struggles of the animal caught cause the ring to go farther and farther down the stick and the weight of the trap finally drowns the animal.

TRAPPERS—Hints to.—The skins of animals trapped are always valued higher than those shot, as shot not only make holes, but frequently plow along the skin making furrows as well as shaving off the fur. To realize the highest price for skins, they must be taken care of, and also cleaned and prepared properly.

1. Be careful to visit your traps often enough so that the skin will not have time to get tainted.

2. As soon as possible after the animal is dead and dry. attend to the skinning and curing.

3. Scrape off all superfluous flesh and fat, and be careful not to go so deep as to cut the fibre of the skin.

4. Never dry a skin by the fire, but in a cool shady place, sheltered from rain.

5. Never use preparations of any kind in curing skins, nor ever wash them in water, but simply stretch and dry as they are taken from the animal.

WILD PIGEONS—To TRAP.—Wild pigeons can often be caught by the hundreds, and in fact we have known an entire flock to be captured at one time in this simple manner: Secure a number of pigeons, say a half dozen; then take a net, as large a one as you can command. Drive some pegs in the ground, and to them fasten one end of the net; then stretch the net, and raise the other end by means of poles, about six feet in length (one at each end of the two corners,) to which fasten a rope, the same to be about one hundred yards long, stretching to some hidden spot, about that distance from the net. Under the seine sprinkle straw and a large quantity of buck-wheat. In the top of the poles which hold the seine up, make a hole, through pass four strings, about two hundred yards long, one end to be fastened to the leg of each pigeon, the other end to be in your possession, in your hiding place. In the straw beneath the seine place two pigeons, tied to a small peg, so that they cannot raise themselves from the ground. When a flock of pigeons are near, throw the four pigeons you have tied to ends of the four strings, and as they fly up, gently pull them back. The flock in the meantime has had their attention attracted. The four pigeons have been pulled back to their place near the seine, and soon after alighting, the flock will also alight. Watch your chance and when the flock is directly alongside the seine, give the rope a pull. It will cover them in a moment and many times you will succeed in taking the entire flock.

WILD TURKEY—To TRAP.—First dig a ditch; then over one end build a rude structure of logs, covered at the top with earth. This structure should be closed sufficiently to keep the birds in. Scatter Indian corn about and in the ditch, and also on the inside of the pen. The turkeys follow up the corn in the ditch, and emerge from it on the inside. Once there, the turkey never thinks about descending into the ditch, but walks around and around the pen looking for a hole to escape through. To make the trap more sure, end the ditch about the middle of the pen, and build over

the ditch a bridge of grass, sticks and earth, just inside the pen, and close to the logs.

FISHING—Baits for.—An earth-worm is naturally the first bait the young angler looks out for; it is always to be had, is put on the hook without difficulty, and may always be used for certain kinds of fish, with the certainty of hooking something, if proper patience is used. When baiting with a worm, the hook should be put in close to the top of the worm's head, and then passed carefully down, gently working the worm up the hook at the same time. Not more than a quarter of an inch of the worm should be left hanging over the hook. To scour or starve these worms, and get rid of the earthy matter they contain, they must be placed in damp moss, not soddened with water, but only damp. In creeping through the fibers of the moss, they compress and empty themselves.

The ash-grub, which is found in the rotten bark of a tree that has been felled some time, is an excellent bait for all small "pan" fish, such as chub, sun-fish, perch, etc., and may be used all the year round; it should be kept in wheat bran. All grubs or worms make good bait for little fresh water fish.

Grasshoppers are good baits during June, July, and August; their legs and wings must be taken off before they are put on the hook.

Shrimp are good for bass, tom cod, and lafayette fish. Crab and clam are good bait for these also, shedder craw especially.

FISHING—With artificial fly.—Artificial fly fishing consists in the use of imitations of these flies, and is unquestionably the most scientific mode of angling, requiring great tact and practice to make the flies with neatness and to use them successfully, and calling forth as it does so much more skill than the ordinary method of bottom fishing, it merits its superior reputation. It possesses many advantages over bottom fishing, but at the same time it has its disadvantages; it is much more cleanly in its preparations, inasmuch as it does not require the angler to grub for clay and work up a quantity of ground baits, and is not so toilsome in its practice, for the only encumbrances which the fly fisher has are simply a light rod, a book of flies, and whatever fish he may chance to catch; but there are several kinds of fish which will not rise at a fly, and even those that do will not be lured from their quiet retreat during very wet or cold weather. It would be as well if the young angler could go out for some little time with an old experienced hand, to observe and imitate his movements as closely as possible; but as many of our readers will not, in all probability, be able to enjoy such an advantage, we subjoin some instructions by which they may pursue this interesting branch of angling.

FISHING—Ground bait for.—Ground baiting is a most essential part of angling, and ought never to be omitted, as success in bottom or

float fishing cannot be expected, unless the proper means for drawing the fish together are resorted to. The object for throwing bait into the water, is to collect fish to one particular spot, and then to use a superior kind of bait, though of a similar kind, on the hook. Thus, if going to angle with earth worms, throw in for ground bait those that are unscoured, and fish with those that are well scoured.

For small creek fish, mix bran and clay together into lumps about the size of an apple; place some grubs in the middle, and close the clay over them. It is a very useful bait in a still pond, hole, or slight eddy.

Or take the crumbs of white bread, soak it in water, squeeze it almost dry, add bran, and work them together until they acquire the consistency of clay.

Brewer's grains will also be found very serviceable; they must be perfectly fresh.

Grubs, worms, the toughest parts of crabs, lobsters, or clams, may be thrown in without taking the trouble of working them into balls of clay, if the water is perfectly still; but if you are fishing in a stream, such a system of ground baiting is injurious, as they are carried away by the stream, and draw the fish from the spot.

FISH—Charms, or secret art of catching.—The following secret arts are given to gratify curiosity on the subject, but, of course, we give them without recommendation. Some of these "secrets" are as follows:

1. For bait, take a handful of swamp-apple blossoms; put them in a glass jar or bottle, together with a gill of rum; cork the bottle tight and let it stand in the sun for three or four hours; then take half a pint of water that is found in places where grows the plant commonly termed fly-trap. This plant, the botanical name of which is *dionœa muscipula*, vegetates in quag moss around fresh ponds.

2. Saturate your bait with the liquid two or three hours before using. The liquid should be kept in a wooden or earthen vessel.

3. Another is to put the oil of Rhodium on the bait when fishing with a hook, and you will always succeed; or take the juice of smallage or lovage, and mix with any kind of bait. As long as there remains any kind of fish within many yards of your hook, you will find yourself busy pulling them out.

4. Get over the water after dark, with a light and a dead fish that has been smeared with the juice of stinking galdwin. The fish will gather around you in large quantities, and can easily be scooped up.

5. Or, take Cocculus Indicus, pulverize and mix with dough, then scatter it broadcast over the water. The fish will greedily seize it and immediately turn belly up on top of the water. Gather immediately, put in fresh water, and they revive. This is the Chinese method.

FISHING—Floats.—A very light float should be used for trout if you use any at all. It is made from quills or cork. For pickerel, salmon, bass, etc., you should get floats made from hollow red cedar, which are very light and appropriate. Cork will answer if you cannot procure cedar.

FISH-HOOKS—How to fasten to line.—When fastening the hooks on your lines, use strong but fine silk, and if you can get it near the color of your bait, so much the better; wax the silk thoroughly with shoemaker's wax, and wrap it four or five times round the body of the hook, then place the gut or hair on the inside of your hook, and continue winding the silk tightly round till you have wrapped it about three parts down the hook.

Whipping is finished off by slipping the end of the silk through the last circle, and drawing it tight. Knotting, by laying two pieces of gut or hair together, one overlapping the other some three inches or so, then holding one end in the left hand, while forming a simple slip knot on it; then turning the other end to the right, and doing the same; after that drawing the two together, when the knot is complete. No direct pull will ever unloosen this water knot, though it can be undone easily. Gut is obtained from the silk-worm. Gimp is any kind of tackle covered with fine brass wire, to protect it from the teeth of fish, sharp stones, or other injury.

FISHING—Hooks.—The old Kirby hook is now generally superseded by the Limerick, which is considered the best fish-hook made. You should examine the point and barb of each hook to see that it is perfect, and file it if it is not. Always have a small file with you.

FISHING—Lines.—Lines are made of India grass, of silk alone, silk and hair, of hemp, of flax, and of cotton. Gut lines are also made, but not easily managed. The best trout lines are made of India grass, though silk, or silk and hair, are frequently used in trout fishing. Trout lines are usually from eight to eighteen yards long, and of various degrees of fineness, according to the size of the fish angled for, or clearness of the stream. Salmon, bass, and pickerel lines are made from hemp, flax, silk, grass or hair, and vary in length from thirty to one hundred and fifty yards. Cotton and hemp lines are made for trolling purposes, and for fishing sea-fish generally. The length of these will vary according to the condition or depth of your fishing grounds. The size of all lines should vary according to the state of the streams or size of your fish. Clear streams require as small lines as will answer the purpose. If you have a good multiplying reel, the line should be as long as the reel will carry.

FISHING—Reels.—Some sportsmen do not consider reels necessary; but this is because they have either never used them, or never had a good article. American-made reels are now considered the best in the market, particularly for taking large fish. The smaller English reel will do very

well for trout fishing. There are two kinds, viz: The plain reel and the multiplying reel. Some prefer the former; but the multiplying reel saves a good deal of time, and is easily worked when you get accustomed to it. Reels are made of brass and German silver. One is as good as the other.

FISHING—Rods.—Fishing rods are now usually made from the bamboo, the Calcutta reed, or of ash wood, as it is necessary they should be made light, tough, and pliable. The butts are frequently made of maple, with bored bottom; and this butt will outlast several tops. Rods for travelers are made in joints, so as to be easily transported. The cost of rods at the tackle stores is fifty cents up to five dollars for ordinary ones; and ten, fifteen, twenty and even as high as fifty dollars for the best and most scientific articles. Some of them are made to be used as walking-canes until needed for sport. A perfect rod should gradually taper from end to end be tight in all its joints, and be equally and uniformly pliable, not bending in one place more than another. The different lengths of rods required in fishing vary from twelve to twenty feet in length.

FISHING—Paste baits for.—Take some old cheese and the crumb of white bread, and mix them up to a tolerable degree of consistency, and you will make a good bait for chub. Knead crumbs of white bread dipped in honey in the palm of your hand until they attain a fair degree of consistency; it is good for small fish. Procure some new wheat, remove the husks, and afterward pound it; then pour some milk or water over, and gently simmer the composition; when cold it will be somewhat like a jelly, and a very small piece only should be put on the hook.

Paste baits are not at all adapted for swift-running streams, but for quiet brooks, ponds, or very still rivers; you must be sharp of eye, and quick to strike, otherwise both fish and bait will give you the slip. A quill float is better than a cork one when baiting with paste, as it betrays the slightest nibble.

Painting and Tanning.

PAINT.—It is always convenient to have paint at hand for doing small jobs. If kept in common paint pots, it soon dries. An empty fruit jar with a close fitting cork answers an excellent purpose; and if the handle of the brush is short, so as to go inside, it is always ready without washing. Putty always ready for use may be kept in the same way.

PAINT—Materials for making.—Any substance that will become dry, after it is applied to the surface of wood or iron, and which will form a thin pellicle, or blanket, that will exclude water, will make good paint.

Linseed oil is of such a nature that it will soon dry, when spread out thin, and will form a thin cover that will exclude water. For this reason, there is no other kind of oil that is equal to linseed oil, for painting.

There is so much grease, or oleaginous substance, in lamp oil, kerosene, and sweet oil, that they will not dry like linseed oil. For this reason such oils are not good for painting.

Paint is mingled with oil, for the purpose of keeping the oil as much on the surface as possible, and for making a thicker and heavier coat, or pellicle, which will resist the action of the atmosphere, or the influences of wet and dry.

OIL—Drying and Boiled.—Linseed oil is mixed with powdered litharge, and heated until it becomes thick. A pale drying oil is obtained by mixing with linseed oil sufficient dry sulphate of lead to form a milky liquid, and shaking it repeatedly for some days, letting it stand exposed to the light. When it becomes quite clear it may be poured off from the dregs. The sulphate of lead, when washed from the mucilage, may be again used for the same purpose. Liebig directs one pound of acetate of lead to be dissolved in half a gallon of rain water, and one pound of finely powdered litharge added. The mixture is either boiled, or exposed for a longer time to a moderate heat, and frequently stirred, till no more particles of litharge can be seen. A white deposit is formed, which may be left in the liquid or separated by filtration; twenty pounds of linseed oil, in which one pound of levigated litharge has been diffused, are gradually added to the lead solution, previously diluted with an equal bulk of water, and the mixture frequently stirred. It is then left to clear itself in a warm place; but to obtain it bright it must be filtered through a coarse paper or cotton. It may be bleached by exposure to the sun. The lead solution which subsides from

the mixture may be filtered and used again, after dissolving it in one pound of litharge as before. The oxide of lead contained in the oil may be removed from it by agitating it with diluted sulphuric acid, and letting it stand to settle.

LACKER OR LAQUER.—This substance is a liquid drier, and will make a good paint when used alone, without any oil. But it is rather expensive for such a purpose, when used alone. Therefore, we mingle it with oil for the purpose of making a better paint, and for making the oil or paint dry more readily.

The more laquer we put into paint the sooner it will dry. Laquer is used in mixing all kinds of paint. Varnish will make a good laquer, but is expensive.

As some laquer is better than others, all that is necessary to use it economically is the exercise of a little good common sense.

PAINT—MAKING WHITE.—If the white lead, or zinc white, has been ground fine, as it always should be before it is used, mingle boiled oil enough with it to make it about of the consistence of thick cream. Then pour in laquer enough to make it thin enough to spread readily with a brush. Good paint will always show for itself when it is just thick enough to flow well.

We usually make white paint, and then obtain any other desired color by mingling paint of other color with the white. I refer to ordinary painting. White lead will form a good body of paint so much cheaper than blue or green, or some kinds of yellow, that we use it in preference to making a paint of a given kind that is very expensive.

PAINT—WHITE.—The white destined for varnish or oil requires a metallic oxide, which gives more body to the color. Take ceruse, reduced to powder, and grind it with oil of pinks, and one-fourth ounce of sulphate of zinc for each pound of oil. Apply the second coating without the sulphate of zinc, and suffer it to dry. Cover the whole with a stratum of sandarac varnish. This color is durable, brilliant and agreeable to the eye.

Boiled linseed oil might be employed instead of oil of pinks, but the color of it would in some degree injure the purity of the white.

PAINTS—LEAD COLOR.—Whiting, one hundred weight; blue black, seven pounds; white lead (ground in oil,) twenty-eight pounds; road dust, fifty-six pounds; lime-water, five gallons; prepared residue oil, two and one-half gallons.

PAINT—BLUE.—In the first place, prepare white paint, and then mingle blue paint with it, and stir it thoroughly until no streaks can be discovered in it. Then dip your brush and paint a little. If it seems too light colored, put in more blue until it appears dark enough.

A small quantity of blue paint will make a large quantity of paint, if it

be prepared in this manner. Blue makes the neatest and most durable paint for painting tools and implements.

PAINT—GREEN.—Lime-water, six gallons; whiting and road dust, of each, one hundred weight; blue-black, thirty pounds; yellow ochre, twenty-eight pounds; wet blue (previously ground in prepared residue oil,) twenty pounds; grind well together. For use, thin with equal parts of prepared residue oil and linseed oil.

PALE GREEN.—Yellow ochre and wet blue, of each, one hundred weight; road dust, one and one-half hundred weight; blue-black, ten pounds; lime-water, six gallons; prepared fish oil, four gallons; prepared residue and linseed oils, of each, seven and a-half gallons.

PAINT—RED.—Red paint is frequently made of oil, laquer and Venetian red. This will make a very dull looking red, and very cheap also.

To make red of a lighter color, make white paint as directed, and then mingle red lead, or any other kind of red paint, with the white to suit the fancy.

Paint is sometimes made of pure red lead, oil and laquer. But, as red lead is so very heavy, it is rather difficult to lay it on smoothly, unless in a very warm room, and unless a person has had some experience in painting.

These directions have been prepared to aid beginners in very ordinary painting.

PAINTING—PLASTER OF PARIS AND GYPSUM IN.—Plaster of Paris, when it is ground fine, will make an excellent paint for outside work. I have been accustomed to use it for painting buildings for several years past, and I find that it is far more durable than white lead or zinc white. My practice has been to mingle equal parts of plaster of Paris and zinc, or white lead, with oil enough to make it of the consistency of cream, and then run it through a paint mill. This will form a good white paint, having an excellent body, which will be far more serviceable than white lead alone. And more than all this, plaster of Paris is very cheap.

For painting roofs of buildings, I have never met with anything that is cheaper and better, where it is desirable to collect rain water, than gypsum and oil. It will form a very hard and durable covering for a roof, and is very clean.

Gypsum is sometimes ground very coarse. When it is so, it should be run through a paint mill before it is used.

PAINT—CARE OF BRUSHES.—Turn a new brush with the hair end up and handle down, and open the bristles and pour in about a spoonful of good varnish. Allow the varnish to become dry, and the brush will never shed its bristles when it is used in painting. The varnish will also keep brushes from shrinking and falling to pieces.

Brushes are usually kept in water, to prevent their drying up; but water is not half as good as oil for keeping them soft and pliable.

As soon as you have finished a job of painting, wipe out the brush clean, and wrap it in a piece of paper and hang it in a small deep vessel containing oil, letting the brush descend into the oil up to the wrapping cord. In this way brushes of different colors, and even varnish brushes, can be kept clean and always ready for immediate use.

It is impossible to keep brushes, and especially varnish brushes, soft and pliable in water.

PAINT—To make rough smooth.—When paint has become rough by cracks, and when there are small seams in the wood that cannot be filled with putty, take a few spoonfuls of white lead (English white lead is best,) and mix it up with boiled oil and laquer, about as thick as it can be mixed. Then take a small portion of it at a time and rub it into the cracks with the fingers until the surface of the paint is smooth and even. Now smooth it off with a stiff brush, dipped in benzole or in spirits of turpentine, and let it dry. This is the easiest and most expeditious way to make the surface of rough paint smooth.

PAINT—To make old dry.—Sometimes paint that has been laid on for years is yet "sticky," and will never become hard. Such paint is a source of great annoyance.

To make it hard, so that it will not stick, apply to it with a brush, a coat of benzole. (See Benzole.) After a day or two, if there is a good coat of paint on it, go over it with a thin coat of laquer, with one-third of its bulk of boiled oil mingled with it. In case the coat of paint is thin, apply another thin coat, which has been prepared by putting in a large proportion of laquer.

VARNISH—To make old dry.—Poor varnish sometimes, when applied to furniture, is a source of vexation. To make it dry and hard, apply a coat of benzole (see Benzole) or spirits of turpentine with a varnish brush in a warm room. After two or three days apply a coat of good varnish and let it dry thoroughly before using the furniture. This is a certain remedy for "sticky" varnish.

Good varnish will always become hard in a short time; while cheap varnish, sometimes, will not become hard in several years.

VARNISH—The way to make it dry.—Gas tar needs no preparation, only for paining tools and implements. It needs something to make it dry. For this purpose, let it be warmed in an iron kettle—not boiled—and mingle with it about one pint of benzole to one gallon of gas tar. This will make a beautiful black varnish, which will dry in a few hours. If it does not dry quickly enough, put in a little more benzole. (See Benzole.)

VARNISH—Shellac, to make.—Put a quantity of shellac in a bottle and pour in alcohol enough to cover it. Cork it tight and place it on a shelf in a warm room, where the shellac will dissolve. Shake the bottle occasionally, and, if it is not all dissolved in three or four days, put in a little more alcohol.

This forms a good varnish for varnishing almost anything, and will dry in half an hour.

BENZOLE.—Benzole is a volatile and nearly transparent fluid, which has the appearance of spirits of turpentine. It can be obtained at most drug stores, at about fifty cents per gallon.

It is frequently used as a good substitute for spirits of turpentine and is very much cheaper than that liquid, and for some purposes it is far more effective than turpentine.

WINDOW BLINDS—The way to paint.—There is a correct rule for painting window blinds, in order to do it neatly and quickly. In the first place, nail a strip of wood an inch or two in width across the end of a barrel; two barrels will make two benches for resting the blinds on. Place them just far enough apart so that the ends of the blinds will rest on the sticks on the ends of the barrels; lay the blind down flat and paint along the inside of the stiles and the sides of the slats near the ends; turn the blind on one edge, and paint the *very ends* of the slats, and smooth off the inside of the stiles and bars; now paint the slats and the adjusting rod, and the last thing paint the stiles and bars.

When the paint on blinds is drying keep the slats open; and do not put so much paint into the sockets of the slats as to prevent their being folded or adjusted easily.

PAINT—Coal tar, or tar.—We know of nothing so cheap and so easily applied as crude Petroleum. Put on all the wood will absorb. Cover the whole implement or machine with it—wood and iron both. It will keep iron from rusting. Do not mix anything with it. If you prefer to use a paint, you can get it ready for use at the painter's. Give it time to dry.

PAINTS—Mixing.—In mixing paints, observe that for out-door work you must use principally or wholly boiled oil, unless it be for the decorative part of houses, etc., then mix as for in-door work. For in-door work, use linseed oil, turpentine, and a little "driers," observing that the less oil, the less will be the gloss, and that for "flatted white," etc., the color being ground in oil, will scarcely require any further addition of that article, as the object is to have it dull. The best "driers" are ground litharge and sugar of lead; the former for dark and middle tints, and the latter for light ones.

PAINTING—Houses, the best time for.—The best time for painting

the exterior of buildings, is late in autumn or during the winter. Paint then employed will endure twice as long as when applied in early summer, or in hot weather. In the former it dries slowly and becomes hard, like a glazed surface, not easily affected afterward by the weather, or worn off by the beating of storms. But in very hot weather the oil in the paint soaks into the wood at once, as into a sponge, leaving the lead nearly dry, and nearly ready to crumble off. This last difficulty, however, may be guarded against, though at an increased expense, by first going over the surface with raw oil. By painting in cold weather, one annoyance might certainly be escaped, namely, the collection of small flies in the fresh paint.

PAINTS—KNOTS TO KILL.—This is a difficult job for the painter, but if these directions are followed, perfect satisfaction will be the result. Take a hot iron and press it against the knot, by which means you extract the pitch, after which use glue size and red lead. Another plan is gum shellac mixed with read lead, or guta-percha dissolved in ether. But if the work is a fine one, after removing the iron, scrape the pitch off with a knife, after which size the knot with oil size, and then lay on it a leaf of gold or silver, after which give it two coats.

PAINT—ECONOMICAL.—We have tried many kinds of cheap paint, some nearly worthless, and others of considerable value. But the best, by far, yet employed, is first a coat of crude petroleum, and then one or two coats of the Averill or some equally good paint, if there is such to be found. We have tried this mode of protecting wood, on several tenant houses. These houses were made of rough pine plank outside, neatly battened, studded or battened on the joints inside, and lathed and plastered on the studding. The roofs were covered with slate laid on felt. When the painting was completed, the exterior had a handsome appearance—better than if painted on a planed surface. We would recommend painting on the rough surface for any battened or vertically boarded house, even if a large and handsome dwelling.

These houses are 16 by 24 feet, with a kitchen wing 12 feet square. The eaves are 14 feet high, making good chamber rooms. A common laborer applied the petroleum with a whitewash brush—half a barrel, costing $6, being required for each house. The cost of applying was two dollars and a half—eight dollars and a half for the petroleum coat. Twelve dollars' worth of the Averill paint (which is furnished by the company in New York, in kegs ready for the brush, and tinted, and sent in this shape by railroad,) was sufficient for each house, three dollars more for painting, making twenty-three and a half dollars for the oiling and painting complete. The rough surface takes the crude oil better, and retains more paint. Hence one coat of the Averill mixture on the oiled surface will answer well

for a long time, when another may be added at less expense. This paint is particularly recommended for *adhering*, a few weeks only being required for the petroleum to dry in before the paint is applied.

One of the houses was sided with good hemlock, making it much cheaper than the pine houses; but more time was required in painting the rough surface. It makes, however, as neat an appearance as any, and forms a handsome cottage when surrounded with flowering shrubs and embroidered with climbers.

PAINTING.—Every farmer has several hundred dollars invested in wagons, carts, machines and implements. Now how much longer would these all last if every crack, joint and pore, was always kept well filled with good oil paint? Probably, on an average, at least one-third longer than if not painted, and more probably at least twice as long. A great deal may be done by keeping them properly housed; but they must necessarily be more or less exposed in use; the heat opens the cracks in summer, a shower often overtakes them and soaks into these cracks. The process is again and again repeated, and decay begins. An overstrain splits them wider, or breaks certain parts. They must be patched or repaired, or new ones purchased. The farmer who has five hundred dollars thus invested might save from fifty to a hundred dollars a year by keeping a pot of paint always on hand, and on an occasional rainy or spare day go over his machines and implements, and fill with paint such as need it. The pot should have a tight cover, so as to prevent the paint drying, which may be best accomplished by using an earthen jar, with a large cork to fit it. Every farmer should keep a vessel of *white lead* paint—the pure article. This is the best for filling in cracks or joints in small tools—it is good for abrasions on the backs of animals, from harness or yokes—it is good for the scratches in horses that have to travel muddy roads—and it is good to paint the mould-board of a plow to prevent rust after plowing is completed.

PAINTS AND WHITEWASH.—For barns, etc.—The following mixtures are given in Wheeler's new and useful work, entitled, "Homes for the People," from which some valuable hints may be derived in forming desirable tints:

A cool grey, similar to what would be the tint of unpainted timber after a few years, may be obtained as follows:

Indian red, half a pound; lampblack, three ounces; raw umber, half a pound, mixed with one hundred pounds of white lead. This color will be changed by the addition of sand, which in all cases is recommended, in a proportion of about one quart to every hundred pounds of mixed color. The finest and whitest sand that the neighborhood affords should be used, and as its hue differs so will the tint of the paint be changed.

This color with one-third less white is very suitable for roofs, and is a cool, unreflecting grey tint of great softness and beauty.

CREAM COLOR, NO. 1.—A soft, pleasant tint, like that of coffee greatly diluted with milk, is oftentimes well adapted to a building, particularly in regions where red sand stone or other similar objects, with such local coloring, give a brown hue to portions of the landscape. It may be mixed as follows: Yellow ochre, five pounds; burnt umber, half a pound; Indian red, quarter of a pound; chrome yellow, No. 1, half a pound, with one hundred pounds of white lead. The key notes in this color are the Indian red and the chrome yellow, and the tone may be brightened or lowered by more or less of either, as individual taste may prefer.

No. 2.—A still more delicate tint, resembling the pure color of the caen stone, and well adapted for large buildings with many breaks or outlines, may be mixed thus: Yellow ochre, two pounds; vandyke brown, quarter of a pound; Indian red, quarter of a pound; chrome yellow, No. 1, half a pound to every one hundred pounds of lead.

A noted agricultural writer says that the following is an excellent receipt for whitewash: Take a clean barrel that will hold water; put into it a half bushel of quicklime, and slack it by pouring over it boiling water sufficient to cover it four or five inches deep, and stirring it until slacked. When quite slacked dissolve it in water, and add two pounds of sulphate of zinc, and one of common salt, and which in a few days will cause the whitewash to harden on the woodwork. Add sufficient water to bring it to the consistency of thick whitewash. If you wish to make this wash of a pleasant cream color, add three pounds yellow ochre. For fawn color, add four pounds umber, one pound Indian red, and one pound lampblack. For grey or stone color, add four pounds raw umber, and two pounds lampblack.

The color may be put on with a common whitewash brush, and will be found much more durable than common whitewash.

KALSOMINING.—Take four ounces of glue, soaking the same in a quart of warm water from fifteen to twenty-four hours, after which add a pint of water; then place the vessel, either tin or thin metal containing the glue, in a kettle of hot water over the fire, the glue being stirred until it is thoroughly melted, and the solution becomes quite clear. Then put five or six pounds of powdered Paris white into a large pail, and add hot water sufficient to make the mixture to be of the consistency of cream. Then mix the glue-water with the same, stirring it constantly and well, after which paint the walls with the mixture with a common whitewash brush.

Spread the kalsomining mixture very smoothly, and to secure this, add a little hot water, that is, if the mixture is too thick. These quantities are sufficient for two coats on a large room, say one of twenty feet square.

BEAVER SKINS—To dress.—You must rip the skin the same as you would a sheep. Stretch it in all ways as much as possible; then it is to be dressed with equal parts of rock salt and alum dissolved in water and made about as thick as cream by stirring in coarse flour. This should be spread on nearly half an inch thick to be scraped off when dry and repeated if one time is not enough. This same process of dressing applies likewise to otter skins.

DEER SKINS—Oil dressing.—For curing deer skins, etc., take the green hide, as soon as removed from the animal, and grain it. This is done by getting a beam seven or eight inches through and six to eight feet long, with two legs in one end and the other resting on the ground so that it will stand at a steep slant. The beam should be of hard wood, should be clean and smooth with no ridges on it. Take a knife, the corners should be whet smooth so as not to cut the skin. Set down the upper end of the beam against your belly and lay on the skin, hair side down, and take off all the unequal substances before you turn the hair side up. Then commence to grain by beginning with the neck of the skin next to you, shoving it against the hair, holding firmly and using some strength; it will soon begin to go and bring a streak of grain. In this way hides are grained when green; when dry they have to be soaked in lime and water until mellow, and then treated the same as a green hide.

BIRDS—To mount.—Lay the bird upon the table with the head to the left; having arranged the wings and legs to keep the bird in the right position, place a weight on the tail. Brush the skin of the neck with the soap, then stuff with the flax, taking care not to distend it. Anoint the back as far as the rump, stuffing it one-third of the thickness, that the wire may rest on a thick layer of flax. Prepare four wires. One for the back, which may be a little longer than the body; at about one-quarter of its length it should be twisted into a small ring, by the pincers, and pointed with the file at the extreme end; two others are to be cut somewhat longer than the legs. The tail wire is to be formed into an oval in size, about one-third of the length of the bird's body, twisting it a short distance from the ends, that they may form a fork; the two prongs to be pointed and bent near enough together to enter the rump; the ends will be hidden under the tail, the oval to enter the body of the bird. The back wire being oiled, may now be introduced across the skull, passing into the back in the middle of the flax, so that the ring in this wire will be brought a little toward the anterior part, and can receive the extremities of each of the wires which have passed through the thighs and claws.

The leg wires are introduced by making a passage through the shank and bone at the thigh, by piercing them with an awl the size of the wire.

The wire must be passed in a straight line over the knee, and is to be brought to the little ring of the body wire. Both leg wires and the end of the back wire are to be twisted together with the pincers, and be lowered toward the tail. The wires thus adjusted and resting on the flax, the skin must be well anointed and filled to its natural dimensions.

The body may now be sewed up with a fine glover's needle and sewing silk, with what is known as ball or carpet stitch.

If the orbits of the eye are not sufficiently plump, a little cotton may be added, moistened with the gum with which the artificial eyes are to be fixed. Give the eye a natural appearance, having the lids well rounded and brought over the glass.

In fixing the bird to a standard its natural attitude should be copied as accurately as possible. The feet should not be too wide apart, the legs should be so bent at the knee-joints and the body so inclined forward that the root of the tail will be on an exact line with the knees. This forms the natural angle. The head may be inclined a little to one side. If the bill is likely to separate, a thread should be passed through the nostrils and tied beneath, until the bird is quite dry.

The feathers should now be carefully smoothed and arranged with a camel's hair brush, and the wings tied in a natural position, and the body should be bound with a little piece of muslin until every part is perfectly dry.

A little paper cone may be put over the head, to keep the feathers in place for a few days.

Stuffed birds should be kept free from dust, in a moderate temperature, out of the sun. A common bell glass will answer to cover a single specimen or a small group. They should be frequently examined, for moths and insects are very apt to get into the feathers.

Five drops of Prusic acid, on a piece of cotton placed in a case, will effectually destroy insects.

LAMBSKINS—To prepare for ladies' overcoats.—Make a strong suds with hot water; let them get cold, and wash the skins, squeezing them carefully to get out all the dirt from the wool; wash the soap out with clean cold water, and cover them with water for twelve hours; then hang them over a pole to drain; when partially dry stretch them carefully on a board, and when a little damp sprinkle on them an ounce each of pulverized saltpeter and alum; lay the flesh sides together, and hang in the shade for two or three days, turning them over every day to bring the under skin uppermost till they are perfectly dry; then scrape the flesh side till all scraps of flesh are removed; rub it with pumice or rotten stone and with the hands; then lay the cloak-pattern down on the flesh side of the skin, trace it round with a pencil, and cut it out with a sharp knife; overcast the edges together

on the wrong side, and line with quilted silk. No collar, fur or trimming is worn with an astrachan or lambskin cloak.

LEATHER—OILING.—Oils should not be applied to dry leather, as they will invariably injure it. If you wish to oil a harness, wet it over night, cover it with a blanket, and in the morning it will be dry and supple; then apply neat's-foot oil in small quantities, and with so much elbow grease as will insure its disseminating itself throughout the leather. A soft, pliant harness is easy to handle, and lasts longer than a neglected one. Never use vegetable oils on leather, and among animal oils neat's-foot is the best.

LEATHER—TO GILD OR SILVER.—Finely powder resin, and dust it over the surface of the leather, then lay on the leaf, and apply (hot) the letters or impression you wish to transfer; lastly, dust off the loose metal with a cloth. The cloths used for this purpose become, in time, very valuable, and are often sold to the refiners at a high price.

LEATHER—TANNING.—It is often a matter of both convenience and economy in the household or on the farm to be able to do a little tanning; so we give here an approved recipe which may prove useful: Soak the skin or hide eight or nine days in water, then put it in lime; take it out, and remove the hair by rubbing it, and soak it in clear water until the lime is entirely out. Put one pound of alum to three of salt; dissolve in a vessel sufficiently large to hold the hide; soak the hide in it three or four days, then take it out, let it get half dry, and then beat or rub it until it becomes pliable. Leather prepared by this process will not do well for shoes, but answers for hamestrings, backbands, and various other purposes on the farm.

MUSKRATS—TO SKIN.—The muskrat is usually skinned by beginning at the head, ripping from the chin to between the fore legs, and then stripping the skin off over the body. When taken off in this manner the skin is stretched on a bent rod of tough, pliable wood. When skinned from the tail it is stretched on a board.

MUSKRAT SKINS—TANNING WITH THE FUR ON.—To do this successfully, first give the skins a good washing in warm water, after which remove all fatty and fleshy matter. Then place the skins in a liquor to soak, prepared as follows: To five gallons of cold soft water add four quarts of wheat bran, one-fourth pint old soap, one-half ounce borax; by adding one ounce sulphuric acid the soaking may be done in one-half the time. If the hides have not been salted, add one-half pint salt. Green hides should not be soaked more than eight or ten hours. Dry ones should soak till very soft. For tan liquor, to five gallons warm soft water, add one-fourth bushel bran; stir well and let stand in a warm room till it ferments. Then add slowly one pound sulphuric acid; stir all the while. Muskrat hides should remain in about four hours; then take out and rub with a fleshing knife—(an old

chopping knife with the edge taken off will do.) Then work it over a beam until entirely dry.

RABBIT SKINS—To cure.—First lay the skin on a smooth board, placing the fur side under, and fasten the skin to the board with tinned tacks. Wash it over with a solution of salt; then dissolve one and one-fourth ounces alum in one-half pint of warm water, and with a sponge dipped in this solution, moisten the surface all over; repeat this every now and then for three days; when the skin is quite dry, take out the tacks, and rolling it loosely the wrong way, the hair inside, draw it quickly backwards and forwards through a large smooth ring, until it is quite soft, then roll it in the contrary way of the skin, and repeat the operation. Skins prepared thus are useful for many domestic purposes.

RACCOON SKINS—To prepare.—The skin of the raccoon should be nailed to boards to dry, then treated to a paste of 1 ounce alum; 1 ounce salt; about ½ drachm sulphuric acid; 2 gills water, and a little wheat bran. It should when dry be scraped off with a spoon or other thing as in case of mink skins. To work the skin soft, instead of nailing it on boards, roll it up and work it soft.

RAWHIDE—How to tan.—When the hide is first taken from the animal, spread it flesh side up; then put two parts of salt, two parts of saltpetre and alum combined—(or as much saltpetre and alum as salt)—make it fine; sprinkle it evenly over the surface; roll it up, and let it lay a few days till dissolved. Then take off what flesh remains, and nail the skin to the side of a barn in the sun, or in dry weather stretch on the ground by driving pegs in the edges of the skin. It must be stretched tight, or there will be hard and ugly wrinkles you cannot get out. After drying, and the flesh is sufficiently off, it is fit to cut up. But to make it "soft and pliable like harness leather," put neatsfoot oil on it—fasten it up again, and let it remain a day or two in the sun. Then take a stick about three inches wide, and long enough to work with both hands, made like a wedge on the end, and rub out all of the oil that can be, and it is tanned with the hair on.

Some persons say a calf skin (a deacon is better,) tanned in this way, and the hair taken off, and blackened, makes excellent boot leather, warranted not to crack. The only trouble is, it will last too long.

Cow skins are stronger and heavier, and are sometimes only salted and stretched; the flesh taken off, cut into strings, braided into halters or other useful things—the hair shaved off with a sharp knife. To make these strips soft they are oiled, buried in cow manure for a few days, then rubbed and worked till dry.

The skin of a white animal is not No. 1, nor a red and white, nor a black and white. Avoid spotted skins of any kind. Red is good; black is better.

For an ox whip, cut these strings about one inch wide at the top, and about eight or ten feet long, running to a point, with a buckskin cracker one inch wide and eight inches long. Hang it to a stick about the length of a walking cane. The stick should be the top of a little pine or cedar. You can crack it so it can be heard as far as one of Col. Colt's pistols. It will last as long as the average county insurance companies.

SHEEP-SKINS—To cure with the wool on.—Take a spoonful of alum and two of saltpetre; pulverize and mix well together, then sprinkle the powder on the flesh side of the skin, and lay the two flesh sides together, leaving the wool outside. Then fold up the skin as tight as you can, and hang in a dry place. In two or three days, or as soon as it is dry, take it down and scrape it with a blunt knife till clean and supple. This completes the process, and makes you a most excellent saddle cover. If, when you kill your mutton, you treat the skins this way, you can get more for them from the saddler than you can get for the wool and skin separately disposed otherwise.

Other skins which you desire to cure with the fur or hair on, may be treated in the same way.

SKINS—Preservatives for.—The best material for the preservation of skins of animals consists of powdered arsenious acid, or the common arsenic of the shops. This may be used in two ways; either applied in dry powder on the moist skin, or, still better, mixed with alcohol or water to the consistency of molasses, and put on with a brush. Some camphor may be added to the alcoholic solution, and a little strychnine will undoubtedly increase its efficacy. There are no satisfactory substitutes for arsenic; but, in its entire absence, corrosive sublimate, camphor, alum, etc., may be employed. Many persons prefer the arsenical soap to the pure arsenic. This is composed of the following ingredients: Arsenic, one ounce; white soap, one ounce; carbonate of potash, one dram; water, six drams; camphor, two drams. Cut the soap into thin slices, and melt over a slow fire with the water, stirring it continually; when dissolved remove from the fire, and add the potash and arsenic by degrees; dissolve the camphor in a little alcohol, and when the mixture is nearly cold, stir it in.

The proper materials for stuffing out skins will depend much upon the size of the animal. For small birds and quadrupeds cotton will be found most convenient; for the larger, tow; for those still larger, dry grass, straw, sawdust, bran, or other vegetable substances may be used. Whatever substance be used, care must be taken to have it perfectly dry. Under no circumstances should animal matter, as hair, wool, or feathers, be employed.

The bills and loral region, as well as the legs and feet of birds, and the ears, lips, and toes of mammals, may, as most exposed to the ravages of in-

sects, be washed with an alcoholic solution of strychnine applied with a brush to the dried skin: this will be an almost certain safeguard against injury.

SKUNK SKINS—To deodorize.—To deodorize skunk skins or articles of clothing scented, hold them over a fire of red cedar boughs, and sprinkle with chloride of lime; or wrap them in green hemlock boughs, when they are to be had, and in 24 hours they will be cleaned.

SOAP—Arsenical.—This soap, used for preparing the skins of birds and other small animals, is made as follows: Two ounces each of white arsenic, white soap, lime slacked in air, camphor powdered, and six ounces of carbonate of potassa, and $\frac{3}{8}$ ounce water, sufficient to make the whole into a paste.

TANNING—Operation of.—The first operation is to soak the hide, as no hide can be properly tanned unless it has been soaked and broken on a fleshing beam. If the hide has not been salted add a little salt and soak it in soft water. In order to be thoroughly soaked green hides should remain in this liquor from nine to twelve days; of course the time varies with the thickness of the hide. The following liquor is used to remove hair or wool, viz: 10 gallons cold water (soft,) 8 quarts slacked lime, and same quantity of wood ashes. Soak until the hair or wool will pull off easily.

As it frequently happens it is desirable to cure the hide and keep the hair clean, the following paste should be made, viz: Equal parts of lime and hard wood ashes (lime should be slacked,) and made into a paste with soft water. This should be spread on the flesh side of the hide, and the skin rolled up, flesh side in, and placed in a tub, just covering it with water. It should remain 10 days, or until the hair will pull out easily, then scrape off with a knife.

TANNING—Curriers' paste for.—First coat, take of water, 1 pint; flour, 1 gill; castile soap, $\frac{1}{2}$ ounce; make into paste. Second coat, take of first paste, 1 gill; gum-tragacanth, $\frac{1}{2}$ gill; water, $\frac{1}{2}$ pint; mix all together. This will finish nine sides of upper.

TANNING—Curriers' skirting for.—This is for finishing skirting and the flesh of harness leather in imitation of oak tanning. Take of chrome yellow, 4 ounces; yellow ochre, $\frac{1}{2}$ pound; cream of tarter, $\frac{1}{2}$ ounce; soda, $\frac{1}{4}$ ounce; paste, 5 pints; mix well. This will finish six sides. *For the grain to imitate oak tan.* Take of chrome yellow, $\frac{1}{4}$ pound; yellow ochre, 4 ounces; cream of tartar, $\frac{1}{2}$ ounce; soda, $\frac{1}{2}$ ounce; paste 1 quart; spirits of turpentine, $\frac{1}{2}$ pint; mix well. This will finish 6 sides.

TANNING—Curriers' size for.—Take of sizing, 1 pint; soft soap $\frac{1}{2}$ gill; stuffing, $\frac{1}{2}$ gill; sweet milk, 1 gill; boil the sizing in water to a proper consistence, strain, and add the other ingredients; and when thoroughly mixed, it is ready for use.

CEMENTS, GLUES, PASTES, ETC.

CEMENT—ARMENIAN.—The jewelers of Turkey, who are mostly Armenians, have a singular method of ornamenting watch-cases, etc., with diamonds and other precious stones, by glueing or cementing them on. The stone is set in silver or gold, and the lower part of the metal made flat, or to correspond with the part to which it is to be fixed; it is then gently warmed and the glue is applied, which is so very strong that the parts thus cemented never separate. This glue will strongly unite pieces of glass and china, and even polished steel, and may be applied to a variety of useful purposes. The following is the recipe:

Dissolve five or six bits of gum mastic, each the size of a large pea, in as much rectified spirits of wine as will suffice to render it liquid; and in another vessel, dissolve as much isinglass, previously a little softened in water (though none of the water must be used,) in French brandy or good rum, as will make a two-ounce vial of very strong glue, adding two small bits of gum galbanum or ammoniacum, which must be rubbed or ground till they are dissolved. Then mix the whole with a sufficient heat. Keep the glue in a vial closely stopped, and every time it is to be used set the vial in boiling water.

CEMENT—ARCHITECTURAL.—1. Reduce paper to a smooth paste by boiling it in water; then add an equal weight each of sifted whiting and good size; boil to a proper consistence.—2. Paper paste and size, equal parts; finely powdered plaster of Paris to make it of a proper consistence. Use it as soon as mixed. Can be used in making architectural busts, statues, columns, etc. It is very light, receives a good polish, but will not stand the weather.

CEMENT—ALABASTER.—1. Finely powdered plaster-of-paris, made into a cream with water. 2. Melt yellow resin, or equal parts of yellow resin and beeswax; then stir in half as much finely powdered plaster-of-paris. The first is used to join and fit together pieces of alabaster or marble, or to mend broken plaster figures. The second is used to join alabaster, marble, porphyry, and any similar substances that will bear being heated.

CEMENT—BUILDING.—This is made by exposing a mixture of clay or loam, broken pottery, flints, silicious sand, or broken bottle-glass, with wood-ashes, to a considerable heat in a furnace, until it becomes partially

vitrified. It must then be ground to a fine powder, sifted, and mixed with one-third its weight of quick-lime, also in fine powder, after which it must be packed (tight) in casks to preserve it from the air and moisture. For use it is mixed up with water and applied like Roman cement.

CEMENT—CHINESE.—1. Dissolve shellac in enough rectified spirit to make a liquid of the consistency of treacle. 2. Boil borax, 1 ounce; and shellac, 1 ounce, in water until dissolved.

CEMENT—CURD.—Add ½ a pint of vinegar to ½ a pint of skimmed milk; mix the curd with the whites of 5 eggs, well beaten, and sufficient powdered quick-lime to form a paste. This cement will resist water and a moderate degree of heat.

HOW TO MAKE A SUPERIOR GUM.—Pour upon 11 pounds best potato starch a mixture of 7 ounces pure nitric acid and 4 pounds 6 ounces soft water; stir well together and let stand for 24 hours at the temperature of about 80 degrees Fahr., stirring from time to time. Then heat to 212 degrees Fahr., add gradually from 4 pounds 6 ounces to 6½ pounds more soft water, and boil till the mass begins to grow thick and transparent. To promote this there may be further added 1¾ ounces pure nitric acid, diluted with 2 pounds 3 ounces of water. The boiling is continued till the liquid is clear, dilute with water if too thick, and strain through a woolen cloth. Next dissolve 11 pounds gum arabic and 2 pounds 3 ounces of sugar in 8¾ to 11 pounds of soft water, warming slowly, and adding a little more water if the whole is not perfectly dissolved. Strain carefully through a woolen cloth, and add to the filtered solution 1¾ ounces nitric acid mixed with a little water. Heat to 212 Fahr., for an hour, adding gradually the first mentioned solution of starch, and allow the whole to stand at this temperature till perfectly clear. If it is at all turbid, dissolve at a boil 8¾ ounces isinglass in 6½ pounds water and 2 pounds 3 ounces alcohol, keeping up the heat till all the spirit has escaped; strain through a woolen cloth, add ½ ounce pure nitric acid, heat once more, and add the solution gradually to the adhesive mixture. If any turbidity appears, filter again. The consistence can be regulated at pleasure by the addition of water.

CEMENT—FOR CHINA, GLASS, CROCKERY, METAL AND WOOD.—An excellent cement for mending china may be made as follows: Take the white of an egg and a little flour, which make into a light paste; clear the parts to be joined from all dust and dirt; spread some of the paste on each piece and press them together; while wet wipe off the exuding portions, both inside and out; then let it remain until quite dry.

The following recipe we know from experience to be a good one, and, being nearly colorless, it possesses advantages which liquid glue and other cements do not: Dissolve ½ an ounce of gum acacia in a wine-glass of boil-

ing water; add plaster of Paris sufficient to form a thick paste, and apply it with a brush to the parts to be cemented together.

FOR MENDING BROKEN CHINA, GLASS, ETC.—Take one pound white shellac, pulverized; 2 ounces clean gum mastic; put these into a bottle, and then add ½ pound pure sulphuric ether. Let it stand for half an hour, and then add half a gallon 90 per cent. alcohol. Shake occasionally till it is dissolved. Heat the edges of the article to be mended, and apply the cement with a pencil brush; hold the article together until the cement cools. This makes a transparent cement.

Take a thick mucilage of gum-arabic and stir it into plaster of Paris—the broken images are best—made very fine, to form a thick paste, and apply to the edges with a brush, and press firmly together and confine there two or three days. We have pulled over 30 pounds against a wine-glass, the stem of which had been broken and mended with this cement.

CEMENT—BRUYER'S WATER.—Mix 3 gallons of clay with 1 gallon of slacked lime, and expose them to a full red heat for 3 hours.

CEMENT—BOTANY BAY.—Yellow gum and brick-dust equal parts, melted together. It is used to cement coarse earthenware, etc.

CEMENT—ENGLISH ROMAN.—Take a bushel of lime slacked, with 3½ pounds of green copperas, 15 gallons of water, and ½ a bushel of fine gravel sand. The copperas should be dissolved in hot water; it must be stirred with a stick, and kept stirring continually while in use. Care should be taken to mix at once as much as may be requisite for one entire front, as it is very difficult to match the color again; and it ought to be mixed the same day it is used.

CEMENT—FOR FLOORS.—Earthen floors are commonly made of loam, and sometimes, especially to make malt on, of lime and brook sand, and gun dust or anvil dust from the forge. The manner of making earthen floors for plain country habitations is as follows: Take ⅔ of lime and 1 of coal ashes well-sifted, with a small quantity of loam clay, mix the whole together, and temper it well with water, making it up into a heap; let it lie a week or ten days and then temper it over again. After this, heap it up for three or four days, and repeat the tempering very high, till it becomes smooth, yielding, tough and gluey. The ground being then leveled, lay the floor therewith about 2½ or 3 inches thick, making it smooth with a trowel; the hotter the season is the better, and when it is thoroughly dried, it will make the best floor for houses, especially for malt-houses. If any one would have their floors look better, let them take lime of rag-stones, well tempered with whites of eggs, covering the floor about half an inch thick with it, before the under flooring is too dry. If this be well done and thoroughly dried, it will look, when rubbed with a little oil, as transparent as

metal or glass. In elegant houses floors of this nature are made of stucco, or of plaster of Paris beaten and sifted, and mixed with other ingredients.

CEMENT — FRENCH.— Make a thick mucilage with gum arabic and water, then add starch in fine powder to thicken it. Employed by naturalists and French artificial-flower makers. A little lemon juice is sometimes added.

CEMENT—GERMAN.—For glass or earthenware. 1. Take 2 parts of gum shellac, and 1 part of Venice turpentine; heat them together in an iron pot, taking care to keep the lid quite close, as the turpentine is very inflammable. When partially cool form into sticks; when it is wanted for use melt near a gentle fire. 2. 2 measures of litharge, and 1 each of unslacked lime and flint glass; each to be pulverized separately before mixing; then, to use it, wet it up with old drying oil.

CEMENT—TO FASTEN LEATHER TO METAL.—A hot solution of gelatine, with this wash the metal; and the leather, previously steeped in a hot infusion of gall-nuts, is to be pressed tightly on the surface and allowed to cool, when it will adhere very firmly.

CEMENT—FOR LEATHER.—A mixture of India rubber and shellac varnish makes a very adhesive leather cement. A strong solution of common isinglass with a little diluted alcohol added to it, makes an excellent cement for leather.

CEMENT—LEATHER OR SHOEMAKER'S.—The following compound is used by shoemakers for invisible patching: To 10 parts bisulphide carbon and 1 part spirits of turpentine, add enough gutta-percha to make a tough, thickly-flowing liquid. The surface to be joined must be perfectly free from grease, which is accomplished by laying a cloth upon them and applying a hot iron for a time. The coat is applied to both surfaces, and pressure made till the points are dry.

CEMENT—FOR IRON BOILERS.—This cement is used to stop the cracks and leaks in iron boilers, stoves, etc. 1. Dried clay in powder, 6 pounds; iron filings, 1 pound. Make a paste with boiled linseed oil. 2. Take 2 ounces of muriate of ammonia, 1 ounce of flour of sulphur, and 16 ounces of cast-iron filings or turnings; mix them well in a mortar, and keep the powder dry. When the cement is wanted, take one part of this and 20 parts of clean iron filings or borings, grind them together in a mortar, mix them with water to a proper consistence, and apply them between the joints.

CEMENT—IRON.—To make an iron cement suitable for making rust joints, mix thoroughly 112 pounds of clean cast-iron borings, or turnings, with 8 ounces of sal ammonia, and 1 ounce of flour of sulphur, and add sufficient water. Keep wet when not to be immediately used, or it will heat and be spoiled.

CEMENT—Liquid.—Cut gum shellac in 70 per cent. alcohol; put it in phials, and it is ready for use. Apply it to the edge of the broken dish with a feather, and hold it in a spirit lamp as long as the cement will simmer, then join together evenly, and when cold the dish will break in another place first, and is as strong as when new.

CEMENT—Optician's.—1. Shellac, softened with rectified spirits or wood naptha. For fine work. 2. Melt wax, 1 ounce, and resin 15 ounces; then add whiting, 4 ounces, previously made red hot, and still warm Used to fix glasses, stones, etc., while polishing and cutting.

CEMENT—For steam pipes.—1. White lead, mixed 2 parts; red lead dry, 1 part; grind or otherwise mix them to a consistence of thin putty; apply interposed layers with one or two thicknesses of canvas or gauze wire, as the necessity of the case may be. 2. (Stephenson's.) If 2 parts litharge are mixed with 1 part dry slacked lime and 1 part fine sand, well rubbed together, and mixed with such a quantity of hot linseed-oil varnish as to form a pasty mass, an excellent cement for iron steam-pipes is obtained, which soon sets hard. Consequently, it must be prepared fresh every time, and applied when still hot.

CEMENT—For stoves.—1. Good wood-ashes are to be sifted through a fine sieve, to which is to be added the same quantity of clay, finely pulverized, together with a little salt. The mixture is to be moistened with water enough to make a paste, and the crack of the stove filled with it. 2. An excellent cement for iron stoves or furnaces is a paste of soluble glass and barytes, with or without some fine fire-clay, and the soluble glass may be replaced by a solution of borax, and both these and barytes by a mixture of clay and powdered glass.

CEMENT—For stopping cracks in jars.—A good cement for stopping cracks in jars may be made as follows: Take equal parts of white lead and white sand, and as much oil as will make it of the consistency of putty; in a few weeks it will become as hard as stone.

CEMENT—Turkish, for joining metals, glass, etc.—Dissolve mastic in as much spirit of wine as will suffice to render it liquid; in another vessel dissolve as much isinglass (which has been previously soaked in water till it is swollen and soft) in brandy as will make two ounces by measure of strong glue, and add two small bits of gum galbanum, or ammoniacum, which must be rubbed or ground till they are dissolved; then mix the whole with a sufficient heat; keep it in a phial stopped, and when it is to be used set it in hot water.

GLUE—Marine.—Mix together gum sandaric, $\frac{1}{4}$ pound; gum mastic, $\frac{1}{4}$ pound, and methylated spirit, 8 pounds. When the gums are dissolved, add $\frac{1}{2}$ pound turpentine, and incorporate this with a thick, hot solution of

the best glue, (to which a little isinglass has been added to clarify it,) and filter through muslin. The marine glue will be impervious to moisture, and will not soften in any ordinarily hot weather.

GLUE—SPALDING'S.—Soak the glue in cold water, using only glass, earthen or porcelain dishes; then by a gentle heat dissolve the glue in the same water, and pour in a small quantity of nitric acid, sufficient to give the glue a sour taste, like vinegar, or 1 ounce to every pound of glue.

GLUE—WATER-PROOF.—Render glue perfectly soft, but not liquid, in cold water; then dissolve it by gentle heat, in linseed oil. It dries almost immediately, and water will not affect it.

MUCILAGE—GOOD.—For household purposes this may be made by mixing six ounces gum arabic, six ounces distilled vinegar, with one ounce white sugar. Instead of the distilled vinegar, two parts acetic acid and ten parts water may be substituted.

SALVE—TO MAKE STICKING.—Three pounds resin, half a pound mutton tallow, half a pound of beeswax, and a tablespoonful of sulphur; melted, poured into cold water, and worked and pulled an hour.

POSTAGE STAMPS to stick well should be wet on their face, *after they are applied*, this effectually prevents the corners from curling up.

PASTE—COMMON.—To a dessert-spoonful of flour add, gradually, half a pint of water, and mix quite smooth; add a pinch of powdered alum (and some add a pinch of powdered resin,) and boil for a few minutes, stirring constantly. The addition of a little brown sugar and a few grains of corrosive sublimate, is said to preserve it for years.

PASTE—FLOUR.—Water, one quart; alum, $\frac{3}{4}$ ounce. Dissolve, and when cold, add flour to make it of the consistence of cream, then bring it to a boil, stirring it all the while.

ANOTHER—HARD.—To the above add a little powdered resin and a clove or two before boiling. This will keep for twelve months. When dry it may be softened with water.

Bee-Keeper's Guide.

The Apiary.

Every family in the country should have its hive of bees, and taking into consideration the small cost and labor that such would amount to, and the immense returns, we cannot see how any family can afford to be without them.

To those who have bees, or contemplate having them, we give a few hints on bee-keeping which may be of value.

The queen is the only perfect female bee in the hive, and lays all the eggs, from which are produced workers. During the time the family of bees are preparing to swarm, she deposits her eggs in drone and queen cells, from which males and queens are developed. To all appearance there is no difference between the eggs for a worker or queen. The queen, in the height of the breeding season, will average fifteen hundred eggs per day, and her laying is not confined to the summer season, but she has more or less brood the year around. The only exception to this is during the coldest weather in winter, or a dearth in the honey harvest. She usually lives four or five years. Any one who sees a queen will readily recognize her, as she has a longer body and shorter (in proportion) wings than the worker, and in appearance having a more wasp-like form of a golden color underneath, with a slightly darker back. Her body is not as large as that of the drone, but longer. There is no danger in handling her, as she never uses her sting, except in combat with rival queens.

Fig. 289. Queen.

THE WORKER BEE is an imperfect or undeveloped female bee, and forms the bulk of the population of a hive. A hive may be large or small—may be fifteen thousand or fifty thousand workers, more or less, just according to the season. The workers gather all the honey, pollen and bee-glue, carrying the latter in little baskets on their thighs, the former in little sacks, sometimes called the first stomach. They secrete the wax from honey, feed the young, clean the hive, and we might say, do all the work except lay the eggs. They are short-lived, on an average in the working season, being only two months. But in winter, when they are idle, they sometimes live six months, or even longer.

Fig. 290. Worker.

The drones are the male bees of the hive, and their only use is to fertilize the queens. This always takes place when on the wing. The queen never leaves the hive, except for the purpose of meeting the drones or lead of a swarm. The less the number of drones in a hive the better, as they are idlers and useless consumers of honey. The bees kill them off when swarming is over, or honey harvest fails. The drones have no stings.

Fig. 291. Drone.

BREEDING.—After the queen deposits the egg, it takes an average of about twenty-two days before the worker comes forth a perfect insect. About twenty-five days are required from the laying of the egg to the hatching forth of the drone. The time for the development of the queen is only sixteen days from the laying of the egg.

SWARMING.—So far no certain signs have been discovered that would indicate the time the first swarm will leave the parent hive. If weather and yield of honey are both favorable, swarms may be looked for when the bees come to be crowded for room, the hive being well-filled with combs, stores and bees, and royal cells in a forward state of preparation. The old queen always leads forth the first swarm. In about nine days after the issue of the first swarm, a second may be looked for, if the weather and honey harvest are favorable. In about three days after the second swarm the third swarm may issue. The two latter swarms may vary more or less from these times, according to the weather and circumstances.

Fig. 292 represents a clustering device for swarms to alight upon. It is made of a block of wood shaped as shown in the engraving, and covered with a piece of black cloth, or felt hat, or it may be stuffed with straw or other material, with a wire hook inserted to hang in a shady place, on the limb of a tree or bush, near and in plain sight of the hives. It would be a good thing to place several of these

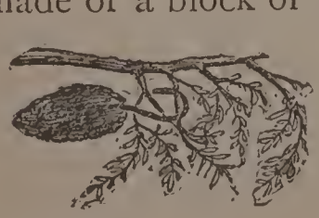


Fig. 292.

devices in different parts of the apiary. A good plan is to string a few dead bees on the device, and swarms will be more likely to settle upon them. Those who have used them give them an excellent recommendation. In hiving they are very convenient, as they are easily detached from the limb, without disturbing the bees, and taken to the hive and shaken down before the entrance or into the hive.

Fig. 293 represents what the Germans call a "bee-course." It is made of half-inch pine boards, secured by battens or cleats, and is about four feet long and two broad at the widest end, and tapering down to the width of the hive it is designed to accompany. Strips are nailed upon each edge, rising about two inches above the surface of the board, so as to guide the bees to the entrance of the hive. In use, the widest end is placed upon the ground and the other supported on a level with the bottom board of the hive by two strips of hoop iron, projecting from the upper surface and resting on the bottom board. It is very convenient in hiving swarms. By shaking the bees near the lower end and dipping up a few and placing them near the entrance, they will set up a call, when the remainder will commence marching up the "bee-course." By keeping a sharp lookout, the queen can be seen as she marches up the board to enter the hive. May, June or July may be the chief swarming months, according to locality and season, and the condition of the stock in the spring. Very few swarms fly away to woods from apiaries that are carefully attended. The careless and negligent bee-keeper often loses some of his best swarms from this cause. If swarms attempt to leave, throw water and dirt among them, and it will prove much more effectual than all the outlandish noise you can make. Use hives perfectly sweet and clean, and use no salt or herbs in their preparation. A swarm may be prevented from leaving by contracting the entrance to *exactly five thirty-seconds of an inch.* This allows the workers to pass, but confines the queen. Without her the bees will never leave. A strip of tin can be tacked over the entrance, leaving a space of five thirty-seconds of an inch between it and the bottom board. In case of second and third swarms, it should be removed the third or fourth day, to allow the queen to fly out to meet the drones.

Fig. 293.

ARTIFICIAL SWARMS, every way equal in value to natural swarms, can be made by those having the movable comb hive. When the bees are gathering honey abundantly, and there are plenty of drones to mate with the young queens, this plan of swarming should be practiced. A short time before, or about the time of natural swarming, should be time selected to practice it.

SURPLUS HONEY BOXES, of a small size, are conveniently made. The sides are glass, and the top, bottom, and ends of pine, one-fourth of an inch thick. Bees will not store as much honey in small boxes as in larger ones, but it will generally bring a much higher price, more than enough to pay the extra cost. Before putting them on the hive let all the corners be cemented with resin and bees-wax, and pieces of bright comb cemented to the top, to induce the bees to commence work early. Fig. 294 represents one of this style stored with honey.

Fig. 294.

A BEE PROTECTOR, or vail, manufactured from black linen thread, with the edges sowed together, forming, when distended, a cylinder large enough to admit the brim of a hat, gathered round the crown with a string, and of sufficient length to be buttoned down under the coat or vest, forms a perfect armor against the sting of the bee. It is light, convenient, and obstructs the vision but slightly. It is immeasurably superior to the old wire bee-hat, as usually constructed. An article that will answer can be made of black barege or lace. The manner of wearing the protector is illustrated by the engraving annexed (fig. 295.) The bee-keeper, armed with a vail, as shown in the figure, and a pair of India-rubber gloves, is perfectly safe from the attacks of a whole apiary. Old bee-masters are seldom stung, but beginners should be so protected that they can go among their bees with perfect confidence and perform all necessary manipulations with deliberation.

Fig. 295.

BEE-STINGS are seldom fatal, but very painful and annoying to some persons. If a little smoke is blown into the hive before the bees are handled, they will fill themselves with honey and will be good-natured. They will become as harmless as flies, and you can even tear their hives to pieces without their showing resentment, if you do not pinch or otherwise injure individual bees, which will resent such personal injuries by thrusting out their stings. Tobacco we believe to be the most effective and convenient article to use for smoking purposes, and should be burned in a tube, made so that the operator can blow through the tube, directing the smoke through any orifice to any portion of the hive. One or two puffs of smoke will mostly answer all purposes. They can be purchased cheaply, or any one that has a little ingenuity, can make one.

When completed it somewhat resembles the annexed engraving, fig. 296. A knob is left on the mouth-piece for convenience of holding between the teeth.

Fig. 296.

THE BEE-MOTH, or miller, and its progeny, are

the pest of modern apiaries. The following engravings, figs. 297 and 298, show the male and female millers. The female is distinguished from the male by her bill-like head. She deposits her eggs in and around the warm portions of the hive, which soon hatch worms, as shown in fig. 299. The worms feed upon wax, and work in the centre of the combs edgewise, enveloped in a kind of tubular covering of web, so that it is with difficulty that the bees dislodge them. Strong stocks will generally protect themselves. Queenless and weak stocks are the most liable to fall the prey of these ravenous worms. If you attend often to your bees, destroy all the millers and worms found about the hives or apiary; you will be quite likely to keep them in subjection. Blocks or sticks placed under the hive, having little troughs or creases cut in them, and turned down upon the bottom board, with frequent openings for the worms to crawl under, form capital hiding places. Remove these every day or two, smash all the worms you find, and replace them for more. If a hive is made snug and tight, as it should be, you will trap nearly every worm, when it seeks for a hiding place to wind up, preparatory to its change into a miller.

Figs. 297, 298.

Fig. 299.

Loss of queen.—If the apiarian discards bee-houses, and sets his hives here and there about his grounds with some distinctive mark about each hive, so that the young queens in their flight can easily distinguish their own homes, the loss of queens will be very few. In the summer, when the drones are in flight, a queenless stock can be furnished with a sheet of comb containing eggs, and they will immediately proceed to rear a new queen. When the drones are not in flight, the queenless stock should be united to a stock containing a fertile queen, but one not very strong in numbers.

Robbing.—Bees often learn to rob by having combs containing honey and other liquid sweets placed or left where they will attract their attention. They should have honey placed above them in the cap, and be well secured against intruders from other hives, if it becomes necessary to feed them. It should never be exposed where all the bees of an apiary can have access to it. If you discover a hive is being robbed, close the entrance so that but one bee can pass at a time. Incline the bottom board to an angle of about thirty degrees, and the bees, unless queenless, will protect themselves with perhaps few exceptions. If any cases of failure do occur, the hole must be closed for a day or two, until the robbers give up the attempt. Provision must be provided, and the hive must be watched for a day or two after it is opened, as the robbers may again return to the attack.

Cement for bee-hives.—A mixture of three-fourths resin and one-fourth

beeswax, melted and kept at the right temperature, in a tin dish, over a kerosene lamp, will be found excellent to cement the corners of hives and combs into frames and boxes.

CONTRIVANCE FOR HIVING BEES.—Take a board as large as the bottom of the hive, bore a number of holes through it, and insert corn cobs through these holes; then nail securely a handle 8 or 10 feet long to this board. Nail a narrow board so as to form a sort of hood over the cobs when it is set up. Make a slanting hole with the crow-bar in the ground, and thrust the pole or handle into this hole. If these cobs are dyed of a dark brown color, the bees will be almost sure to light upon them. But should they light on the branch of a tree a few gentle taps against the limb will induce them to leave it and adhere to the cobs. These, from their rough surface, will enable the bees to hold on firmly. When they have settled take out the pole, lay the instrument flat, and place the hive on the board which holds the swarm, and the thing is done. In large apiaries two or three of these may be on hand for use.

WINTERING BEES.—A writer in a bee journal says, that of all the ways he "has tried," he has met with success in wintering in straw hives, upon their summer stands. They guard against sudden changes of the temperature: give good ventilation, and allow all the moisture to pass off.

THE MOST PROFITABLE BEE TO KEEP.—The United States Government, a few years ago, was so favorably impressed with the importance of the Italian bee, and its superiority over the native bee, that they made some importations through the Patent Office Department, at a very heavy expense. Their superiority consists, first, in their being more prolific; second, that they swarm earlier; third, that they are more hardy and endure more cold, and consequently work earlier in the day and later in the season; fourth, that they store more honey, and store honey when black bees starve; fifth, that they are stronger, have a longer proboscis, and can reach the bottom of cups of flowers that black bees are unable to. This may be tested by placing wire cloth over a glass filled with honey and placed in the apiary where both blacks and Italians may have free access; the Italians will be found drawing from it after the blacks have deserted it. Sixth, they are more vigorous and vigilant in defending their stores; seventh, they are more tractable and less liable to sting. Practical observations have more than doubled our confidence in and admiration of the golden Italian, which is worth its weight in gold. Infusing pure Italian blood in a native colony is infusing new life, energy, a new spirit of industry and economy into the hive, which we find practically illustrated in our examinations recently made, which showed that honey is stored as a general thing in proportion to the amount of Italian blood in the colony, the pure Italians

having the greatest amount, and the blacks the least. Italianizing, or changing black bees to Italians, is another very important feature in the science of apiculture. The queen is the presiding head of the colony and the mother of all, consequently they are of the same blood. When a pure Italian queen meets a black drone her working progeny will be hybrids, while her drones will remain of the same blood as herself, as fertilization never affects the drones, hence the necessity of pure drones to perpetuate the pure stock.

TO ITALIANIZE A COLONY.—First remove the black queen. About 24 hours after introduce the Italian queen, when in about 21 days the entire colony will be Italian bees. The colony from which the Italian queen was removed will, as soon as they find themselves queenless, proceed to rear another, and will build from five to fifteen queen cells, which, after they have been capped over, may be removed or transferred to other queenless colonies that have been twenty hours or more without a queen. Great care should be taken that not the least damage should be done to the cell, which must be cut out with a sharp knife and a corresponding hole cut in the comb in the hive to which you wish to transfer it, in which place the cell in its original position as near as may be; the bees will at once wax it fast and nurse it until the queen appears. The primary steps in Italianizing should be taken early in the season, before the queen commences to lay drone eggs, by cutting all drone comb from the black colonies and thus prevent the raising of any black drones; or, what might be better, take the drone comb from the black bees and give it to the Italians until filled with drone eggs, when they may be returned to the hives from which they were taken, where the bees will hatch them out. This plan may be pursued where many drones are wanted.

Uniting colonies is another very important matter which we cannot pass by, as the present disastrous crisis in agriculture renders it very essential and important to be understood. Colonies that become too weak to be self-sustaining should be united, which may be done with perfect safety by first alarming the bees in both hives, that they may fill themselves with honey, which will render them more sociable. After this operation, which takes but a few minutes, they may be sprinkled with sweetened water, or peppermint, or other pleasant and odoriferous liquids, which will serve for a time to render the bees all of the same scent, making it for the time being impossible for them to distinguish each other. The top of one hive may then be removed and the frames lifted from the other and the bees shaken into it. The best queen of the two should be preserved. All comb containing brood or honey should be transferred to the hive with the bees. All empty comb should be preserved, as its value can hardly be estimated

when we consider that every pound of comb is equal to twenty pounds of honey, or that the bees will store twenty pounds of honey in the same time they are building one pound of comb, hence the valuable acquisition of comb foundation, which commends itself to all practical bee-keepers. This subject might be pursued to much greater length, but let it suffice to say that the new light that has been shed upon this pleasing and interesting branch of science by a Huber, a Dzierzon, a Siebold, a Langstroth, a Tupper, a Harbison, and a host of others, has made this branch of industry both pleasing and profitable. The new demands for honey in Europe and America have stimulated it to more rapid strides upward and onward until it no longer is considered in the light of insignificancy, but has now assumed a character of national importance.

Fig. 300.—Asterias Butterfly.

THE BEET is quite free from insect enemies, the only insect that is entitled to any consideration being the striped blistering-fly. The beetles many times appear in great numbers, attacking potatoe-tops, and stripping them bare of their foliage.

REMEDY.—The only remedy that we know of is to gather them in pans and destroy them by sinking the pan (it being covered) into boiling water.

THE CARROT AND PARSNIP, like the beet, are not troubled much by insects. The negro-fly, which produces a yellow maggot that bores the root of the carrot in Europe, has not yet done much damage to the crop in this country. But the leaves of these two vegetables, and also those of parsley and carraway, are eaten by a large, thick-bodied apple-green worm (fig. 301,) with black bands. This worm finally becomes a beautiful large butterfly, which is called Asterias butterfly (fig. 300.) There are two broods each year, the worms appearing in July and again in August. They should be picked off by hand and killed.

Fig. 301.—Parsnip or Parsley worm.

THE RADISH is troubled with the striped flea beetle, the leaves being perforated with small holes by it. For treatment see under head of cabbage.

THE CABBAGE seems to have more enemies than any other vegetable,

its roots, stalks and leaves each having its particular enemies. The root frequently has its surface excoriorated and its interior bored by the larva of a maggot called cabbage-fly, which is very destructive, especially on young plants. They also destroy cauliflowers. The larva seems in all respects like that of the radish-fly. There are, of course, many remedies recommended, but a correspondent says that he saved his plants from general ruin by sifting powdered tobacco upon them, repeating the operation in case the dust was blown or washed off by a high wind or rain storm.

Another species, termed young centipedes, or thousand-legged worms, also attacks the roots of the cabbage. There are several varieties of this worm, but all pertain to one species, and are known as the flat-backed centipedes, see fig. 302, and the round centipedes, the difference being in their form. They can easily be caught by setting traps for them. Pieces of old boards and large chips scattered about the garden will nightly gather a number under them. They can then be easily killed by cutting them in pieces with a knife. But the best manner to destroy them is to confine in the garden, under a small coop, a hen with small chickens.

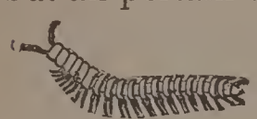


Fig. 302. Flat-backed Centipede.

The worst enemy of the cabbage is the well-known cut-worm. These cut-worms are the larva of a dark colored miller or moth. These moth appear early in the month of July, flying about by night, and many times entering dwellings by the open windows, being attracted by the light. The worm will sever cabbages, beans, cucumbers, and other tenderous plants, and from this habit it derives its name. The best plan we know of to destroy these worms, is to look over the garden plants every morning, and whenever a plant is found cut off, make a search for the roughened spot in the ground where the worm is secreted, find and destroy it.

Fig. 303. Cut-worm moth at rest.

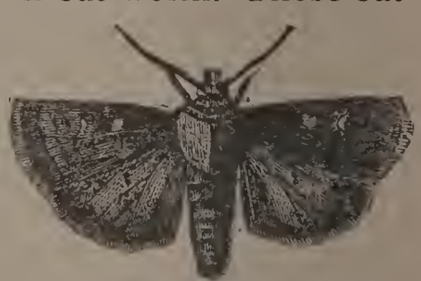


Fig. 304. Cut-worm moth flying.

Cabbage is also, especially when young, greatly injured by flea-beetles, which perforate small holes in the leaves. There are three or four species of this insect which trouble us, but the most destructive one is the striped flea-beetle, which is shown in fig. 305, magnified. It will only attack young plants. Dusting the plants with ashes, plaster, lime, soot, snuff, sulphur, or a mixture of two or more of these, every second or third day, should never be omitted. Toads are beneficial to a garden, and should never be molested.

Fig. 305. Striped Flea-beetle.

The garden flea, another leaping insect, fig. 306, is a very small one, smaller than grains of gun-powder. Where a flea-beetle or other in-

Fig. 306. The Garden-flea.

sect makes a wound in a leaf, these small insects become gathered along its edges, which causes the wound in the leaf to be made larger and prevented from healing. The remedy for these insects is the same as for the striped flea-beetle, cut-worm, etc.

The cabbage has yet more enemies. One of the most important of which is a species which occasionally appears in particular neighborhoods in such large numbers as to completely riddle the leaves with irregular holes of all sizes. It is in appearance a small cylindrical pale-green worm, in size about one-fourth of an inch in length, and drops itself down from the leaf by a thread. The moth, fig. 308, measures about three-fifths of an inch across its wings when extended: its fore-wings freckled with black dots, and having a broad, wavy white stripe on the innner side.

Fig. 308. Cabbage Moth.

The leaves of the turnip and ruta-baga are liable to have large, irregular holes eaten in them, by the same pale green worms, the larva of the white butterfly, which we have noticed under the head of cabbage. The striped flea beetle frequently riddles the leaves of the turnip with small holes, and can always be found in larger numbers upon the leaves of the turnip than on the cabbage. The cabbage Aphis is an insect which will be oftener met with than any other upon the cabbage and ruta-baga. Early in June when the cabbage plants are but two or three inches high, they make their appearance on them, and before long they become very numerous, every plant being crowded with them. Tobacco smoke will cleanse any plant from lice, where it is so applied as to penetrate between the leaves sufficiently to reach every insect upon them. Soap-suds, so often recommended, will only kill the young tender lice, leaving the old ones alive to found new swarms of these pests.

Fig. 309. Wingless female of the Cabbage Aphis.

Fig. 310. Winged Female of the Cabbage Aphis.

CUCUMBER, the Squash and the Melon Vines are so alike, the same insects which are enemies of one are also enemies of the other. The worst enemy of these vines is the striped yellow cucumber beetle, or "cucumber bug," as it is frequently called. Fig. 311 represents one of the worms, greatly magnified. Inside of the cell which it thus forms, the worm throws off the larva, and becomes a

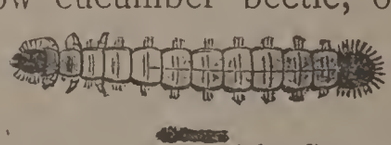


Fig. 311. Larva of the Cucumber Beetle.

pupa. After remaining in this form about two weeks, it casts off its skin again, and acquires its perfect form.

It now has the form of fig. 312. These beetles make their appearance in May, and continue through the whole season. Enclosing the hills in boxes, open at bottom and top, has proven to be one of the best protections.

Fig. 312. Cucumber Beetle.

The Squash coccinella or "spotted squash bug" as it is more generally called, feeds upon the leaves of the squash, eating them in large circular holes. We are accustomed to call these insects Lady-bugs, and to regard them of value, feeding as they do upon plant lice, that we view it as strange, that a member of this species should sustain itself upon vegetation. The larva after attaining its growth, crawls to some shaded place, and changes to a pupa, enclosed in the dry and thorny skin of the larva. It remains in its pupa state dormant for a week, when the beetle in its perfect form crawls out from the thorny case.

Fig. 313. Larva of the Squash Coccinella.

Fig. 314. Squash Coccinella.

The only remedy yet discovered is hand-picking, or brushing them from the leaves into a pan of brine or boiling water.

THE SQUASH-BUG is a terrible enemy to the squash and pumpkin vines. See Fig. 315. They may be destroyed by pressing and cracking them between the thumb nails, or those clusters near the edge of the leaf may be torn off and tramped on, or destroyed by fire.

Fig. 315. Squash-Bug.

SQUASH-BUGS—To KEEP OFF.—Knock the bottoms out of cheese boxes, nail on screen cloth, and set them over the hills. When not in use pack them away, and one set will last a number of years.

TOMATOES are infested with a very large, thick bodied, green worm, as shown in fig. 317. These worms do not belong exclusively to the tomatoes, but prey upon the vines of the potato also. Likewise they invade tobacco, causing much injury to that plant by the holes they cut in the leaves, and is undoubtedly the worst enemy the tobacco grower has to contend with. The fig. 318 is

Fig. 317.—Tomato Worm.

Fig. 318.—Tomato Worm Moth.

the mother or miller, the parent of the worm, and is called Five Spotted Hawk-moth. There is very little difference between the Southern tobacco worm, or as it is called in its perfect state, Carolina hawk-moth, and the above. The same measures are resorted to for subduing both these worms, and that is hand-picking, and the operation must be repeated daily.

The potato is usually the least molested, but the ten-lined Potato Beetle is an enemy that is well worth while looking after. It also preys on the leaves of the tomato. The only remedy is hand-picking, or brushing or shaking the insects in a pan of water.

Fig. 319. Ten-lined Potato beetle.

Fig. 320. Three-lined Potato Beetle.

The Three-lined Potato Beetle is an insect related to the preceding, and has the same habits. It is also common upon the stramonium. The only remedy known is to pass along the row of vines, and break off the leaves on which they occur, dropping them on the ground and tramping on them.

THE CURCULIO OR PLUM WEEVIL is undoubtedly the most troublesome and expensive insect in the country, with perhaps the wheat midge excepted. It attacks nearly all of our important fruits, with the exception of the grape, currant and gooseberry. The only remedy that we can recommend is to thoroughly mix four ounces of sulphur and one pound of whale-oil soap; stir well together half a peck of quick lime in four gallons of water, and when it settles pour off the clear liquid, and add it to the soap solution, to which four gallons of tolerably strong tobacco water are also to be added. When the first mark of the curculio is seen upon the young fruit, take a syringe and drench the foliage thoroughly with the mixture, and in case rain occurs within three weeks to wash it off, repeat it. But the surest plan of decreasing the numbers of these insects in our grounds, is to pick up all the withered fruit which drops from the trees, and feed it to the swine, or burn it or otherwise effectually destroy it. The worm within the fruit, if it happens to be full grown when this drops, will leave it and enter the ground, perhaps within a few hours. Therefore, during the latter part of June and the fore part of July, the ground under the trees should be passed over daily, at least when sufficient air is stirring to cause much of the blasted fruit to fall. Or the same end will be attained, if swine can be pastured in the orchard at this time, to forage under the trees for themselves.

Fig. 321. Curculio.

Another remedy, brought to public notice over thirty years ago, not claimed as an effectual but as a partial safeguard against this insect, and the utility of which is attested by long and extensive experience, is the fol-

lowing: Soon after the blossoms have fallen, when the first wounds of the Curculio begin to be seen upon the young fruit, spread sheets beneath the tree reaching as far out as the limbs extend, and with the hand, if the tree is small, with a wooden mallet if it be large, strike against the body of the tree a blow sufficiently heavy to give the whole tree a sudden jar. To prevent the bark being bruised when thus struck with a mallet, hold against it, to receive the blow, a piece of carpeting or coarse cloth, wound around the end of a strip of thin board, some four inches wide and two feet long. A portion of the weevils, alarmed with this jar of the tree, will drop down upon the sheets, and will lie there a short time as if dead. Then crush them between thumb and finger. Repeat this operation daily.

WIREWORMS are among the worst pests to our garden crops, and we might add, to our field crops also. They have come to be designated as "snapping bugs," because when they spring or sudden snap, they make a loud click, something like the ticking of a clock. They attack potatoes, cabbages, turnips, beets, carrots, onions and lettuce in our gardens; and also strawberries, pinks, carnations, dahlias and numerous other flowers; but the greatest losses are from the destruction of the field crops, Indian corn, rye, oats, barley and wheat.

Fig. 322. Common Snapping Beetle.

THE ELATER, which is most frequently found in our gardens, or as it is usually called, common snapping beetle, fig. 322, is covered with short, fine, prostrate ash-gray hairs; its wing covers having rows of punctures resembling the stitches of a garment. The wireworms which we meet with in our gardens, are nearly all of one kind, and no doubt but that they are the progeny of these beetles. There really is no remedy against these destructive insects. It is important to kill the small young ones which occur early in autumn—but the only plan we can recommend for their destruction is hand picking.

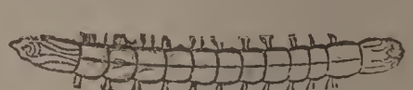


Fig. 323. Common Wireworm.

APPLE-TREE CATERPILLAR, which during the month of May forms large cobweb-like nests in the forks of the limbs of apple and cherry trees, is well-known. The best remedy is, to be on the lookout for the nests of these caterpillars when the season for their appearance arrives, and whenever one of them is discovered with the worms gathered in it take the first rough stick that is at hand and press it into the fork of the limb, and draw it up and down upon one side of the fork and the other, until the nest and every worm which can be seen are ground together into fragments.

Fig. 324. Moth of apple-tree Caterpillar.

APPLE-TREE BORER is an insect almost as destructive to the apple tree itself as the curculio is to the fruit. The bark and wood over the burrow which this borer makes always dies, and if the tree survives it never recovers from the injury. Bushing the butts of the trees thickly with air-slacked lime is about the best remedy we know of, and we have more confidence in its good qualities than soap. But, if notwithstanding these precautions, any worms become established at the root of the tree, they should be searched for, discovered and destroyed.

Fig. 325. Apple-tree Borer.

APPLE BARK LOUSE is another destructive insect. It is in appearance as a little brown scale, one-eight of an inch long. Smearing the bark of infested trees with grease or oil early in June, is a most effectual remedy.

PEACH TREE BORER is very destructive to the peach tree, and in appearance and habits somewhat resembles the apple tree borer. The trees should be examined every spring. A glance will show if any gum is exuded between the ground and root, and if such be the case, the worm causing it should be searched for, discovered and destroyed. A bank of ashes or slacked lime is then placed about the butt of the tree to the height of a few inches, and taken away in autumn, this prevents the moth from getting near the root to deposit her eggs.

Fig. 326. Peach tree Borer. (male)

Fig. 327. Peach tree Borer. (female)

ORCHARD CATERPILLAR.—The vast number of these caterpillars in many parts of the country admonishes orchardists to destroy them before they make such progress again as they have in the past. Some apple trees have been entirely stripped of their leaves—not only rendering a crop impossible, but checking the growth of the tree at the most important period of the year, and rendering it liable to injury by winter, and retarding its vigor in future. It is not too soon on August 1st to commence the destruction of the eggs, which have been recently placed upon the young twigs. As they are usually on the projecting shoots near the outside of the tree, the practiced eye will quickly detect their presence, and a single clip of a pair of orchard shears, placed on the end of a pole, and worked with a cord, will bring them to the ground. This is much easier than the more laborious and more uncertain process of brushing, swabbing, winding, threshing, pounding and crushing, after the caterpillars are half or wholly grown, for no individual escapes when the little ring of eggs is taken

off entire. In the autumn, after the leaves have fallen, pass around again and clip out the remainder. By going through the orchard at least two or three times, there is less chance for any accidentally hidden rings to escape. A cloudy day should be selected, so that the light may not dazzle or injure the eye; and after some practice, it is surprising with what quickness any one may detect these rings on the twigs, by a glance over the apple tree. Cherry, pear and other trees should be examined in the same way.

A careful attention to these instructions any time before spring, will completely clear the orchards of this pest, and the owner will have the satisfaction as he passes the trees, of seeing them full of healthy foliage, without the annoyance of witnessing these huge nests on denuded branches.

CURRANT WORMS.—A correspondent says that he treats his currant worms occasionally in summer by sprinkling the bushes with cresylic soap suds, made quite strong, and followed with a coating of freshly slacked lime. The lime alone, if applied when the foliage is wet with dew or rain, is generally effectual if thoroughly applied. He believes that gypsum or gas lime made fine, will kill the worms. The currant worm is moist, and tender, and soft, like the snail and pear slug, and the remedy for the latter used by nurserymen is lime well scattered over the trees.

CANKER WORMS.—A correspondent gives the result of his experience and observations on this insect. Tar applied to a belt of coarse paper or cloth, placed around the tree, does well at first, but soon forms a crust, especially on cool nights, over which the worms pass. Mixed with oil, the tar is better, but the difficulty is not removed. Cheap printer's ink is still better.

APHIDES—Rosin smoke for.—A correspondent of the *Revue Horticole* states that he has used successfully for some years, the smoke of rosin instead of tobacco smoke, for destroying or repelling aphides on plants. Rosin, as all are aware, is very cheap, produces much smoke, and is much less offensive than tobacco to most horticulturists. It is worthy of trial on such delicate plants as roses, etc., that happen to be infested with aphides.

ROSE BUG is a buff yellow beetle with shining yellow legs and very long black feet. It appears the latter part of June, and remains about a month, feeding mostly on the blossoms and leaves of the rose. But at times it becomes immensely multiplied in a particular locality, and then attacks the grape, apple, cherry, plum, and even some of the wild forest trees, stripping them of their fruit and leaves, and sometimes hanging in clusters from their limbs, like a swarm of bees. Hand picking, or, early in the morning, beating and shaking them from the trees upon sheets, and crushing, burning, or otherwise destroying them, is the only remedy for them at present known.

LICE ON ROSES.—An English writer says that quassia and soft soap will destroy aphides on roses—used by boiling four ounces of quassia chips for half an hour in a gallon of water, and when cold and strained adding two or more gallons of water and six ounces of soft soap. With this, syringe the bushes. The best, however, is tobacco water, made by pouring a gallon of boiling water on four ounces of tobacco, and covering till cold. The shoots may be syringed or dipped in it.

CATERPILLARS.—A quoted writer says: "I took a pan, large and flat, filled it with burning charcoal, and placed it under a tree—then added a pint of rosin, and two ounces of sulphur. The fumes scattered the worms."

MICE PROTECTOR—FELT AS.—There are four principal modes for protecting fruit trees from the depredations of mice under snow—namely: Clean ground; mounds of smooth earth; treading the snow hard about the tree, and hollow cylinders of tin, sheet-iron or felt. The tin cylinders are durable; the felt cheap. The dimensions of the pieces of felt must depend on the size of the tree. If the tree is two inches in diameter, a breadth of seven inches will go around it; if three inches through, the felt must be ten inches. One foot high will answer, but a foot and a half is safer. A sheet of felt will make enough for quite an orchard, and may be had at a low price of any slate roofer.

MICE REPELLERS.—Generally a smooth, compact mound of mellow earth, free from grass, and made a foot high, late in autumn, is best. But sometimes a roll of sheet-iron or sheet tin is more convenient. Sheet tin is best, and will rust less than iron, unless the latter is well coated with gas tar. Roofing tin, fourteen by twenty inches, will make to each sheet four protectors, seven inches high and three inches in diameter, costing about five cents each. They last many years. They may be applied after some snow has fallen, with a little pressure and turning about. Fig. 328 represents one of these protectors, and fig. 329 several nested together.

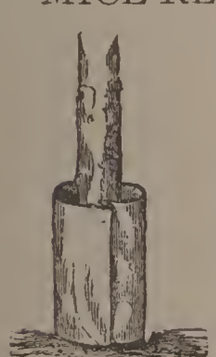


Fig. 328.

Fig. 329.

MICE, MEADOW—HOW TO TRAP—The most satisfactory way we have ever tried of trapping the various spieces of mice that infest meadows, grain-fields and fruit-orchards is, to sink several old barrels in the ground, about two-thirds their length, at different parts of a field, and bore three or four one and a half inch holes in the staves, say six or eight inches from the top of the barrel, or at that point of the barrel which will come even with the surface of the ground. Then, when the mice run along, they will be attracted by the barrel, will enter the holes and jump into the barrel.

As they cannot climb up the inside of a barrel they can easily be disposed of. If a few inches in depth of water should collect in the barrel, field mice will plunge into it and be drowned—provided the surface is covered with dead grass and leaves. If the top of the barrel is left uncovered, and if there should be no water in the barrel, cats will soon learn to take every mouse from the trap. In many States wood-meadow mice abound in large numbers, in the forest; and they frequently enter adjoining fields and do much damage to grain, or to young fruit trees. The prairie meadow mouse and the long-haired meadow mouse frequently do a vast amount of damage in a few days. But any of them can be trapped readily in a barrel. They are all exceedingly prolific. Some females will rear three broods or litters of from four to eight each, every season, Hence, every female destroyed in the spring may be considered equivalent to twenty mice.

PEA BUGS—Destroying.—A correspondent of the *American Farmer* tried a very simple and satisfactory experiment to prevent bugs in peas. Having discovered the egg in each pea while yet in the pod, he gathered them as soon as they were ripe and thoroughly dry, and closed them air tight in bottles. The insect could not grow without air, and the next spring not a bug was to be seen.

ANTS—Black.—A correspondent of the *Country Gentleman*, says he tried many remedies for black ants without any success. His ground being gravelly, he could not makes holes with the crowbar to entrap them; tin cylinders, sunk in the earth, containing molasses, they went into—helping themselves with the molasses and crawling out again. Tar around his trees became crusted in one day, and they crawled over it. They seemed to care nothing for all his attempts to get rid of them. He at length presented them a *bill* for *collection*, for damages done, and that answered completely. Chickens completely routed them, the coops being placed about the garden walks. In one week, the last ant disappeared.

ANTS—Red, how to destroy.—Take a white china plate, and spread a thin covering of common lard over it, and place it on the floor or shelf infested by troublesome insects; you will be pleased with the result. Stirring them up every morning is all that is necessary to set the trap again.

CHICKEN MITES—Remedy for.—Take common leaf tobacco, as much as the user may think necessary, and make a strong tea, letting it boil some time so as to get all the strength from the tobacco; then sprinkle the tea all over and about the place where the mites are, and if the first application is not sufficient, use in same manner a second time; but the first time is almost always effectual.

RABBITS GNAWING TREES.—Let me repeat it, for my neighbor

says several of his fine young apple trees have been ruined lately by the rabbits gnawing them: Take thick *lime whitewash* and thin it with strong *tobacco juice.* A bucket full will serve 200 trees, and a man can make it and put it on in half a day. It is effectual, for I have tried it.

GAS TAR FOR INSECTS.—Humphrey Howland, of Aurora, N. Y., has found gas tar the most efficient agent for destroying the common orchard caterpillar. It is applied by means of a swab on a pole, and so powerful are its effects that the slightest touch the insects receive from the pungent and corrosive liquid kills them instantly.

TURNIP FLY.—This insect often proves very troublesome by eating the plants when they first appear. One remedy is to push the plants by manure, as already mentioned; another is to make a smooth surface to the land, either by fine pulverization or rolling. We often observe the crop destroyed on cloddy portions of the field where this insect finds a ready hiding-place; while on lighter parts of the same field, where the harrow has left a smooth surface and no clods, the crop entirely escapes. A cultivator of the common flat turnip always succeeds in preventing the attacks of the fly by first covering the ground with old straw and burning it before sowing the seed. This could not be adopted for large fields, but is only applicable to small patches. The same result occurs on new land which has been burned over in clearing.

WHEAT MIDGE, better known as the weevil, is by far the most destructive of all our insects. They begin to make their appearance a little before the middle of June, and for over a month the female is busily engaged in placing her eggs between the chaffs of the wheat ears. They are most active in a moist atmosphere, and cannot endure a dry one.

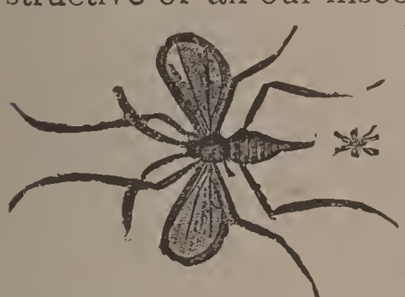


Fig. 330.—Wheat Midge flying.

Fig 331.—Grain Weevil.

In regard to remedies, none can be guaranteed, and every farmer knows that only by late sowing can he prevent his wheat from being headed and in bloom, till the season has passed for the weevil to deposit its eggs therein; but in attempting to save his wheat from the weevil by postponing from the best period, he is liable to have an inferior crop. Yet it is in the power of every farmer to do much towards diminishing the numbers of this insect. Whenever the screenings of the fanning-mill abound with the yellow larvæ of the weevil, they should be burned, or fed under cover to the poultry or swine; they should never be thrown out in the open air to mature, as they there will, into a swarm of flies, to live at the expense of

the wheat the following summer. The wheat stubble every year should be turned under with the plow, so deep that in their efforts to work their way up to the surface the following year, they will become exhausted and perish.

The Hessian Fly instead of taking up its abode in the wheat heads, and living on the kernels, like the wheat weevil, makes its attack at the root and lower part of the stalks, thus destroying not only the seed, but also the whole plant. The Hessian fly resembles a mosquito, but is somewhat smaller. They hatch in about a week, and the small worm crawls down the sheath of the leaf to its base at the crown of the root below the surface of the earth, where it remans, living upon the juice of the plant, without wounding it, but causing it to wither, turn yellow and finally die. The Hessian fly is everywhere followed up and destroyed by two parasitic insects resembling small ants of a black color. There are two generations of the Hessian fly each year, one coming in May and the other in September, and it is only on fall-sowed wheat that this insect depredates to any very serious extent. Where spring wheat is exclusively cultivated, the insect never makes its appearance.

Fig. 332. Hessian Fly.

There are a number of other insects which produce a diseased appearance in the ripening grain, somewhat similar to that of the Hessian fly—one infests wheat, two of them infest barley, and another attacking rye. One of these insects, fig. 333, represents a female greatly magnified, and the result of their attack is so near alike that of the fly, that many believe them to be one and the same. But in this they are mistaken. These insects are named and distinguished from each other as follows:

Fig. 333.
Barley and Joint-worm Fly.

THE BLACK-LEGGED, OR MASSACHUSETTS BARLEY FLY.—They attack the barley and almost destroy the crop.

THE JOINT-WORM FLY is a great pest; attacks wheat, and is very destructive.

THE RYE FLY attacks rye and does considerable damage to a crop.

THE YELLOW-LEGGED OR NEW YORK BARLEY FLY is a great pest to barley, and in some portions of the country does great damage.

The only remedy that we can advise, is to cut the grain so high up that most of the worms will be left in the stubble of the field, and then at some dry time in the autumn, setting fire to and burning this stubble.

THE YELLOWS is a very destructive and contagious disease, mostly confined to certain portions of the country, or such as receive trees from infected districts. It first shows itself by the premature ripening of fruit, two or three weeks sooner than usual; afterwards, small, wire-like shoots are commonly thrown out from the larger branches, the tree dwindles and finally dies. There is no known remedy, and the first thing to do when the disease makes its appearance, is to dig it up and burn it, planting no other tree on the site. Good cultivation and fertile soil is the best preventive.

CHINCH BUG is the great pest to the wheat growers of the Southern and Western States. Every one knows this insect. It is an old friend to every farmer. Not being satisfied with doing all the damages it can to the wheat crop, but as soon as that is harvested, these bugs migrate to the nearest field of Indian corn and doing the same destructive work over again. Their smell and flavor are so disgusting that birds do not molest them, and no remedy for them has yet been discovered.

Fig. 334. Chinch Bug.

THE ANGOUMOIS MOTH, one of the most destructive insects in wheat, oats, barley, Indian corn, etc., is to be found in the Southern States. It only feeds upon ripe grain, attacking it in the field before harvest, and continuing its operations in the mow and out-door stacks, but being most destructive in bins or granaries, flouring mills and storehouses. The most effective method of destroying them is to subject the infested grain to the heat of about 190 degrees Fahr. without losing its germinating powers, and this will kill all the insets and worms in it.

Fig. 335. Angoumois Moth.

Fig. 336.
Grain Aphis—the winged female.

THE GRAIN APHIS is a species of plant louse. No remedy is yet known for this pest. Fortunately nature has provided a number of other insects, which are its inveterate foes, which slay and feed upon it. Among the enemies of the aphis is the lady bug.

Fig. 337. Grain Aphis—the wingless female.

In the cultivation of Indian corn, the worst enemy we encounter is the

cut-worm, which by night severs the young plants at or a little above the surface of the earth, and lies concealed during the day slightly within the ground. These worms also cut off the cabbages, beans, and other young tender plants in our gardens. They are so well known that any particular description of them and their habits is unnecessary. It is one of the millers which in July and August most frequently flies in at open windows in the evening, attracted by the light of the lamp. And the other species are similar to this, though usually of darker and more sombre colors, with the fore wings less diversified with marks and spots.

Fig. 338. Cut-corn moth.

DAIRY AND BUTTER-MAKING.

BUTTER-MAKING—RULES FOR.—1. For making good butter, the first thing is to have good sweet pasture, free from weeds or any growth that will give a bad taste to the milk. Good upland grass is better than coarse grass growing on wet places. Some dairymen think that limed is better than unlimed land, but this is a matter of minor importance. Others regard the practice of sowing plaster in spring, and repeating it early in autumn, as tending to sweeten grass.

2. Good, well selected cows are the next requisite.

3. Perfect cleanliness from beginning to end, is indispensable—the most so, perhaps, of any one thing. No dirt or dust must drop into the milk, for which reason the animals should have a clean place to lie on, and never be allowed to stand in mud or manure. Vessels all thoroughly washed—scalded whenever necessary to preserve perfect sweetness—including pails, pans, pots, churns, workers, and tubs or firkins. They must first be washed clean with *cold* water; for if hot water is used first it will curdle the milk in the cracks or corners, and prevent its washing out.

4. A perfectly pure *air* is of great importance. Bad odors will taint butter. The dairy house therefore should be far away from manure yards, and everything else of the kind. Keep tobacco smoke off the premises.

5. Let the butter be well worked, so as to press out all the buttermilk. It is impossible to have a good article if this is not done. Perhaps this is

the most common cause of failure. If much milk is left in, it soon ferments and makes rancid and worthless butter.

6. In laying down for winter, use *new* firkins—never use them a second time; and pots and jars must never be used, if they ever had bad butter in them, or pickles, or anything else that will taint them; the taint can never be wholly removed.

7. The best dairy salt is important. Butter in hot weather must be covered and excluded from the air with saturated brine.

ANNOTTO—CHOICE OF.—Annotto should be chosen of a good flame color; brighter in the middle than on the outside. It should feel soft and smooth, and have a good consistence. It should possess a strong smell.

BUTTER—"WHY DON'T IT COME?"—It is difficult to manage cream in cold weather, so as not to have the churning occupy an unreasonable length of time, to the injury of the quality of the butter. A correspondent says, "that the following are some of the causes that delay the butter from coming. The milk has been kept too cold, which prevented the cream from souring. Sour and sweet cream may have been mixed. The cream from farrow cows may have been mixed with cream from those that are not farrow. The cream may not have been sufficiently warmed, and the cows may have lacked salt while fed on dry food. The milk may have stood too long before it began to change. These should all be guarded against."

BUTTER—PHILADELPHIA.—One reason that we have seen assigned for the acknowledged superiority of Philadelphia butter, is the care farmers in that section take to remove every cow whose cream, partaking of an oily character, does not separate freely from the milk, but is what dairy-women call *ropy*, and will never harden into anything but *oily* butter. The editor of the *Rural Advertiser* says he once owned one such cow, and her milk spoiled the butter of twenty cows.

BUTTER—PACKING.—Let the firkin contain as much as possible—that is, pack as *solid* as the work can be done.

BUTTER WORKERS.—The following two different forms are adopted for butter workers, and are variously prefered by different manufacturers. One consists of a brake or lever, fastened at one end by a swivel joint, so that the face of the brake may be brought down with force on the butter, which rests on a trough-table, which is best if with a marble top. Another form has a grooved roller, similarly attached, which is used by rolling and pressing the butter at one operation. The former is represented by fig. 340, and the

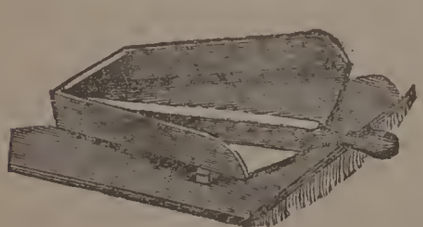


Fig. 340.

Fig. 341.

latter by fig. 341, which also shows the pail into which the buttermilk flows.

BUTTER—WINTER.—The different modes of treating the cream and milk in winter to make good butter are greatly inferior in their results to the effects of giving the cows themselves a regular supply of sugar beets or carrots, the latter, as we think, being much the best. They will nearly double the ordinary amount of milk, and increase its richness, while the butter it produces has that yellowness and fine flavor peculiar to that commonly made from pastures. It is always a loss of quantity for butter to come too soon by churning; but sometimes its gathering is too long delayed after the minute granules of butter are formed. The process may be often hastened by dropping into the churn at this period a small lump of butter, which serves as a nucleus around which these granules quickly coagulate.

Another butter-maker gives the following as his experience: I have seen and read much in your papers about butter-making in winter, but I think I have a better way than I have seen yet. I make as much butter in winter, and of as rich color, as in the best butter times of summer. I stable my cows all cold and stormy days (of course nights;) have plenty of water in the yard; feed them three times a day and grain once, which is done in the morning after they have eaten their fodder. I feed ground black-eye marrowfat peas, scalded with hot water and stand three or four hours before feeding. I feed about two quarts at a time, mixed with hot water about as thick as thick gruel, and after standing three or four hours it will be as thick as corn meal pudding, and measure four quarts. Peas fed this way, especially marrowfats, are worth double the amount of any other grain you can feed, and will make cows give more milk. Well, I have told you the feeding and care of the gentlemen's department, and will now say a little about the care and management of the cream and milk in the ladies' department, which is quite as essential as any. Strain your milk, and not fill your pans more than half full, for if filled it takes too long to get sour. Then set them on a stove with a slow fire and heat them well through; the cream will rise and the pans will be fit to skim two days sooner than though they were set away cold. The cream will rise quick and sweet; therefore you will have rich and sweet butter. Generally the cream rises quick, and is not sour enough to churn, but will sour enough in your cream pail by churning time. Before you churn set your pail by the stove and heat it well through, and the butter will come half an hour sooner than though it was churned cold; and before churning scald your churn with hot water. I have tried this way of making butter until I am confident there is no better way.

BUTTER, RANCID, boiled in water with a portion of charcoal (say a tenth part.) will be entirely divested of its rancidity, and may be used for cooking purposes, although its fine flavor will not be restored for the table.

CREAM GAUGE AND MILK LACTOMETER.—The cream gauge (fig. 342,) with figures toward the top only, will show the exact percentage of cream; and the lactometer (fig. 344,) will show the density or specific gravity, as shown in fig. 343, the per cent. glass filled with pure water, lets the lactometer sink to the water line. The fig. 343 containing water rendered dense by the addition of ingredients, stands at the skim-milk point; and the other cream gauge, with a little salt added to the water, floats the lactometer at the pure milk figure. Hence the lactometer, of itself, is of little value in detecting rascality. Skimming, watering, and adulterations, are best shown by the test-glasses, which are only indicators, and need to be backed up by legal proofs, which are usually ocular demonstrations. Still if the lactometer and cream-gauge both show a patron's milk to be deficient when delivered at the factory, and specimens taken at his home from the can—which is watched and known to contain no skimmed milk or water—tries all right, it would be difficult for an intelligent jury to refuse to bring in a verdict against him for either skimming or watering.

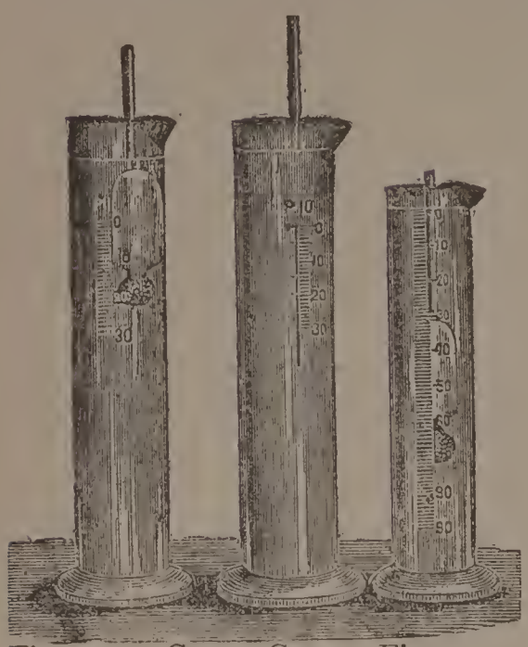


Fig. 342.—Cream Guage. Fig. 343.

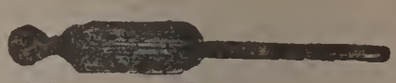


Fig. 344.—Lactometer.

MILKING YOUNG COWS.—A recent agricultural writer has said that young cows, the first year they give milk, may be made with careful milking and good keeping, to give milk almost any length of time deemed desirable; but if allowed to dry up early in the fall, they will, if they have a calf at the same season, dry up at the same time each succeeding year, and nothing but extra feed will prevent it, and that but for a short time.

MILKING STOOL.—The stool represented in the annexed figure is described at length by a correspondent of an agricultural paper, which he says has given decided satisfaction to all concerned, viz: the milker, cow, milk, stool, clothing or pants' legs, manure, milk-maid, butter-maker, etc. It is made of a half inch board two feet and a half long, and ten inches wide. An inch board four inches wide is nailed or screwed across one end on the lower side, and another across the other end on the upper side. These cross pieces serve to stiffen the stool and brace the legs. The milker when using it sits over the single leg with his face towards the other end and his feet on each side of it. The milking pail is placed on this

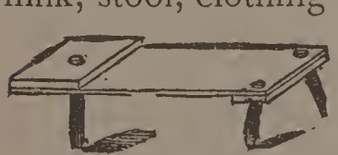


Fig. 345. Milking Stool.

other end, and the stool placed in position under the cow, and milking continued as in the common process.

MILKING IN SILENCE.—As the Farmers' Club at West-Cornwall, Ct., one of the members observed that no talking should be allowed while milking was going on. Another said he had discharged a man because he would talk and interrupt the milking in his dairy, and in three days the increase of milk was equal to the man's wages.

MILKING CLEAN.—Experiment has shown that the last milk drawn from the cow, is from ten to twelve times richer than the first drawn portions, or contains that proportion of cream.

MILKING—Regularity in.—Each cow should have a steady milker be milked as fast as possible, and all the milk drawn. We are satisfied that there is a loss of one-third in many dairies by the lazy, hap-hazard way in which cows are milked. We have known persons to sit down in the milking-yard, and go through with some long yarn, and be from ten to twenty minutes milking one cow, when it should be done in less than five.

Household Pests and Remedies.

RATS AND MICE—Keeping out.—A gentleman in Maryland writes, that five years ago he perfectly excluded rats and mice from a brick stable, by laying the sleepers flat on the ground, and then filling between them with cement to their face, and before drying in the least, nailing hemlock plank firmly on them. No rat or mouse ever gnawed through that floor. The basement of his house had the floor laid in a similar manner, using matched inch pine instead of hemlock. To keep them from entering behind the lathing in the upper walls, three inches of cement was laid on the floor between the studs. He adds, that barns may be kept tolerably clear by raising the floor a foot and a half from the ground. Cats will run under and catch anything there. If laid close to the ground without cement, the floor becomes a perfect warren for all sorts of vermin.

RATS—Driving off the.—The *Farm Journal* gives an experiment performed with chlorine gas. A dish of manganese and muriatic acid, for producing this gas, was placed under the garret floor, and on the lathing below it, the floor board being replaced. The gas, being heavy, descended in every direction between plastering and walls, and being exceedingly pungent, produced a "great sensation." "All night long, it would seem as if Bedlam had broken loose between the partitions." They decamped, big and little, and stayed away three months. Chloride is a poisonous gas, unless in minute portions, and great caution is required not to breath much of it. It should be well confined within the walls. It is an admirable purifier, at least. The best rat trap or rat poison we ever found, is a good cat.

RAT TRAP.—A good one may be made by filling a smooth kettle to within six inches of the top with water, and covering the surface with chaff. The first chap who gets in makes an outcry because he cannot get out, and the rest coming to see what the matter is, share his fate.

A writer in *Moore's Rural*, says he fills a swill-barrel full of good swill—the rats soon learn to come and eat. After a few days, six or eight inches of the swill are dipped out, when they still find their way into the barrel, but not out. Sixteen rats were thus caught in one night.

Another, and one of the best of which, is an oblong box, one end and cover of which is in one piece, and when set rising above the trap as shown

in fig. 346, and held up by a cord passing from the top through a smooth hole in the rear end to the inside, along the corner, around a smooth peg, to where it is attached to the bait, and so fastened that it will drop at the first nibbling. A still better form is a trap with both ends thus raised (fig. 347,) the cords passing through a cross-piece in the middle, and arranged so that both ends shall drop at the same instant. These animals being cautious of entering holes or corners, are more easily drawn into a box open at both ends. Another mode of catching them is by means of steel traps, set with suitable bait. Some individuals among them, however, are too cunning to be caught in any trap, and sometimes evince a degree of intelligence in this direction that seems almost incredible. The writer once made several fruitless efforts to catch an unusually cunning rat. A steel trap was placed in a large tin-pan, and covered with light bran so as to be entirely concealed; and lest the rat should perceive the scent of the hands on the bran, a spoon was used for covering. Pieces of toasted cheese were then scattered over the surface. The next morning the cheese was taken, and little tracks were seen on all parts of the bran except immediately over the trap, which was untouched and unsprung. Trapping rats is a good amusement for ingenious boys; but many would prefer a shorter and easier remedy. Poisoning with arsenic generally succeeds well, but requires great caution, and should never be adopted where there are small children, as fatal accidents have sometimes occurred. Different modes are adopted for using the arsenic; it may be rubbed with twice its bulk of lard or butter, or sprinkled on small fragments of chicken or turkey, and placed entirely out of the way where rats frequent. Another mode is to use fresh caustic potash, sprinkling it thinly around their holes and on their paths. It corrodes their feet, which they then lick and their tongues are corroded. They dislike such treatment and disappear from the premises. The best remedies which we have found after long years of trial, are a few good cats. If not fed so high as to make them lazy nor so low as to dishearten them, they will be sure to clear every rat from the premises where they can have access.

Fig. 346. Rat Trap.

Fig. 347. Another Rat Trap.

MICE.—Nearly all the preceding remedies are sufficient when used for mice, especially the cats. The small traps sold in the shops, answer a good purpose if owners are willing to take the trouble to set them.

SKUNKS.—These animals frequent the vicinity of houses for the purpose of stealing eggs, chickens, etc. On more than one occasion we have had them enter the house cellar through the windows. They are very easily caught in the box traps already described, with an egg or piece of meat for

bait—when they may be carried out into the open fields and shot. They are also easily poisoned by breaking the end of an egg, dropping in a little arsenic, and placing it where it will be accessible to them, and beyond the reach of any domestic animals.

HOUSE FLIES.—Various traps have been employed for flies on the decoy principle, but these usually do more harm than good by constantly inviting new comers. We know of no remedy entirely satisfactory. A good deal may be accomplished by keeping rooms dark; or by driving them out and placing frames of mosquito netting in the windows. By not allowing dishes of food to stand long in dining room or kitchen, but placing them speedily in the cellar closets or safes, the tendency to draw flies will be lessened. We have known a dwelling to be kept nearly clear of them for an entire summer by a half-grown cat that had a special fancy for catching them. We have also known the owner of a house to keep his rooms almost free from them, by spending a few minutes daily in catching them with his hand. He always struck towards their heads, sweeping his hand against the wall, and scarcely ever failing to make a capture. They were then thrown in a basin of soap-suds held in the left hand. One of the best remedies is to poison with cobalt, which may be had at the shops. Make one or more small basins of sheet-iron or rusty tin, by bending up the sides of a piece a few inces square, as in fig. 348, mix the cobalt with water and place it in these basins. The flies eat, drop dead, and are swept up from the floor. The sole reason for using rusty iron for the basins is to render them forbidding in appearance and to prevent accidents. If placed in clean porcelain basins, children may be in danger of becoming poisoned by idly partaking of the mixture.

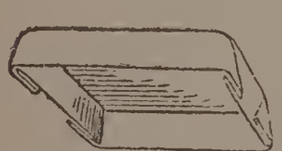


Fig. 348. Pan for Fly Poison.

FLY-TRAP.—A very good fly-trap is made by filling a teacup nearly full with suds, and covering with thich paper smeared on the under side with molasses. Cut a hole large enough for the flies to crawl in easily. They are best caught in a rather dark place.

ANTS.—Various modes have been adopted to kill them. Among these is to coat pieces of brown paper with molasses, sprinkle thinly with arsenic, and place them where they will be accessible to the ants, or the rough sheet iron pans already described, may be partly filled with sugar and water and a little arsenic. Such remedies should be carefully kept beyond the reach of children. Another mode of killing them is to wash a sponge freshly, to open its pores, and then sprinkle fine sugar into these pores. The ants will enter in large numbers, and may be killed by plunging into scalding water. It may be questioned whether the employment of these remedies will not invite the ants in large numbers as well as kill them;

and whether using them out of doors would not be better. It is said that red ants may be repelled from shelves by rubbing with fine salt. A skillful housewife informs us that she can exclude ants with certainty, from cake, sweetmeats and other articles specially attractive to them, only by placing them upon a table, each leg of which stands in a vessel of water. Doubtless the same result might be attained by placing the articles in a pan or other vessel resting on pebbles in another larger one containing water, as shown in section in the annexed figure 349.

Fig. 349.

BED-BUG (*Cimex lectularius.*)—This sometimes proves an excessive annoyance, and has been found by many difficult to extirpate. Travelers (the writer among the number,) have sometimes preferred sitting up all night to attempting to sleep in certain badly kept hotels in remote countries. The Irishman consoled himself and his friends after a night of fruitless attempt at sleep—"Indade, I did quite as well as the bugs, for not one of them slept a wink all night." Among the many exterminators proposed for these insects, we have found two that have proved quite efficient. One of these is to dissolve a small quantity of corrosive sublimate in about twenty times its bulk of alcohol, and apply it with a brush to every part of the bedsteads and rooms likely to be infested. Two or three thorough applications usually accomplish the purpose. A more efficient and complete remedy is to beat up quicksilver with the white of an egg until a thorough intermixture is effected. A twentieth part in bulk of quicksilver is sufficient. Apply it thoroughly with a quill to every crack and crevice. We have never had a failure after the first application. Kerosene has been more recently tried, and we are assured on good authority is a perfect remedy.

MOTHS.—Keep the furs or woolens in trunks or drawers made of red cedar wood. Small pieces of gum camphor rolled in paper and placed among the furs have proved a good remedy. Moths which have already entered garments or carpets may be killed by exposure to bright sunshine; or they may be steamed to death by placing a moistened coarse cloth, as crash towel, upon the substance and passing a hot iron over it.

MOTHS are effectually excluded from clothes kept in cedar chests, or with cedar shingles occasionally laid between the clothes, in wardrobes, closets, etc.

MOTHS IN CARPETS.—Powdered alum is a safeguard against moths when applied to every crack in the floor and around the edges, and under the baseboard, under a carpet. It is also considered a security against the carpet bug. Some ladies powder the whole floor with it before putting down a carpet.

COCKROACHES are killed or repelled by taking equal quantities of

red lead and Indian meal, about the consistency of paste, with molasses, placing it upon iron plates where vermin are thickest. Borax scattered upon the shelves is said to be a good remedy.

EARTH-WORMS OR ANGLE-WORMS, may be prevented from entering wells by digging a trench three feet wide, close to the stone work and down well into the hard-pan, filling it with gravel, which they will not dig through. No top soil should be allowed.

REMEDY FOR MOLES.—Cut apples or potatoes in pieces about the size of a pea, and roll them in strychnine or arsenic. Then make several small holes where the moles run, and drop one or more of the pieces in each hole. In a short time the moles will disappear.

NURSERY, ORCHARD AND FRUIT GARDEN.

WORK FOR JANUARY.—Tread the snow about young trees to prevent the gnawing of mice. There are several preventatives against these mischievious nuisances, which can be found elsewhere. Rabbits also should be attended to, and, like the mice, we give directions elsewhere. Provide surface drainage for water caused by thaws or rain.

Hardy young trees may be primed in the winter, but all large wounds should be carefully covered.

Cut grafts and pack them away. For directions see elsewhere.

See to it that all your fences are in order, and that cattle cannot intrude on your premises.

If you desire young trees, now is the time to give your orders, and be careful to deal with only first-class and reliable nurserymen.

ROOT GRAFTING is now in order.

Spread manure over the surface about young trees, to enrich the land, and protect from the winter blasts.

ORCHARDS should now be accurately registered, and every name and variety should be taken down.

FORCING STRAWBERRIES.—Begin with a rather low temperature, or about 55° and as growth advances, gradually increase to 60° and 65°. Give a good supply of water but avoid flooding. Grapes for forcing, now coming into leaf, the temperature should be kept at 60° to 65°. Equalize by pinching the shoots on different portions of the vine, especially on grapes in pots, retarding the upper shoots and encouraging the lower.

As to grape cuttings, these should at first be kept rather cool, and afterwards the heat gradually increased.

For Southern States read directions for February.

WORK FOR FEBRUARY.—Follow the directions for January, most of which apply to the present month.

Cut off and destroy all caterpillars' eggs on the shoots of orchards. Root grafting of the apple may now be performed. Top-dress with manure the surface of orchards wherever they are

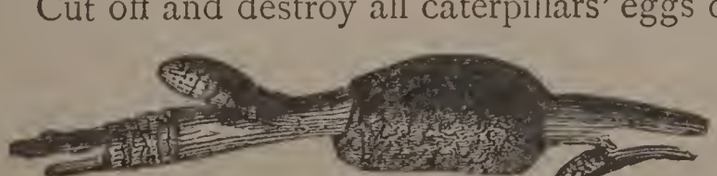


Fig. 350

not growing with sufficient vigor, or which do not make annual shoots a foot or more long.

Provide or make labels, stakes, ladders, etc., and these can be made on stormy days.

All hardy trees may be pruned any time during this month; but those inclining to be tender, such for instance as the peach, should not be pruned before next month. But all pruning, which is intended to promote growth should by all means be done before the buds swell in spring.

GRAPES in early heated houses will now begin to swell their buds, and should be syringed night and morning. A temperature of 50° to 55° at night is sufficient for the first two weeks. Thin the branches, but do not handle the berries.

For Southern States the directions for March and April will apply.

WORK FOR MARCH.—Finish all uncompleted work mentioned in January and February.

Prepare for setting out trees. All prominent buds on the stock should be rubbed off at the same time, as this will lessen the subsequent labor when the shoots begin to start, and prevent that check in the tree, which is always given when any amount of foliage is removed after the growth has commenced.

HARDY GRAPEVINES may be pruned if the work has not already been attended to. Also grape eyes may be started in hot-beds. They are, or should be, placed in pots about half or two-thirds of an inch deep.

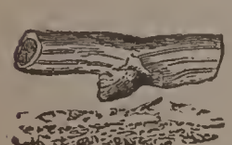


Fig. 351.

Fig. 352.

THE CHERRY should now be grafted, but in order that it should be a perfect success, it should be done at least a week or two before the buds begin to swell. Plums should be grafted immediately afterwards. Finish cutting all grafts before buds swell. In case you desire to raise stock from cherry stones, they should be planted as early as possible, and as soon as the ground thaws

Shorten back peach trees, as described elsewhere.

IN GRAPE HOUSES, grapes under heat will need constant attention. Pinch laterals, thin bunches, if too many, and give air and plenty of water.

For Southern States read directions under April and May.

WORK FOR APRIL.—Prepare for setting out trees.

Shorten back before the buds expand.

TRANSPLANT STRAWBERRIES.—Early in the spring is the best time for setting out strawberries, and if the work is well done, they will bear a moderate crop the present season, and a heavy one the next.

GRAPES, RASPBERRIES, ETC., laid down and covered last autumn, should have the covering, if not already done, removed as early as possible.

SET OUT currant, gooseberries and quince cuttings as early as possible; also seedling apples, young pear trees, etc.

As we directed in last month, grafting the cherry and plum should always be done before the buds begin to expand. Young trees which were budded last summer should have the stocks cut back.

Plant all sorts of fruit-tree seeds on the very commencement of their sprouting or as soon as the earth thaws. Peach stems may be left later than others, as they do not start so soon.

HARDY GRAPES, if not already pruned, may still be cut freely. Bleeding, as it is termed, will not injure the vines.

Level down the small mounds thrown around the young trees last autumn, to protect against mice and winds, and spade in winter mulching.

Manure strawberries.

Prune old wood out of currant bushes and spade in manure, and the size of the berries will be enlarged.

Pinch in young shoots of grapes in green-houses towards the end of the month, and thin bunches. Grapes in hot-houses need uniform warmth and air. For the Southern States read the directions for May and June.

WORK FOR MAY.—Fruit trees may still be set out, if dug early, and kept from growing in a cool place, even if the leaves have commenced growing, but the shoots should never be cut back after the swelling of the buds. The soil should be kept clean and mellow about young trees. All useless shoots should be rubbed from the stocks of young trees which have been grafted, or which were budded last summer and headed down. This should be done at the time of their starting, as removing the foliage in large quantities always checks growth.

Fig. 353.

Stake up young trees; tie to stakes before much of the young wood has been formed. Also, as soon as the young shoot from the inserted bud grows a few inches, it should be tied up to the stump of the stock, as shown in the engraving, which has been left for this purpose, unless already quite straight and upright.

Commence thinning fruit on overbearing trees. Attend to the weeds. Less labor will now eradicate them, than in a few months.

Insects, as warm weather advances, will increase and become numerous. Destroy them early before they commit serious damage. Kill orchard caterpillars by swabbing with soap-suds or lime wash.

Give air, warmth and moisture to vines in houses.

Clear out borers from apple trees, and commence the destruction of the

curculio. See for directions elsewhere. For Southern States, read directions for June.

WORK FOR JUNE.—Continue the operations of last month wherever necessary or useful. Destroy weeds and cultivate the soil, keeping it clean and mellow wherever young trees are planted.

Follow the directions of last month in respect to rubbing off the starting shoots on the stocks of fruit trees that were budded last summer or grafted this spring, and tie up the new shoots. If the young trees are not yet staked, it should be attended to at once. See directions last month. Make a war upon the curculio. Destroy aphides, as soon as they appear, by strong soap-suds, etc., and the currant worm by dusting with hellebore. Keep a lookout for the borer at the foot of the apple tree, and destroy all that can be discovered. Examine peach tree, for peach grub. Cut off the twigs of the plum trees as soon as they show any indication of the black-knot. Caterpillar's nests should be searched for and destroyed. Fire blight in the pear is a formidable disease, and the affected limbs should be cut far back on its first appearance and the limbs cut off should be buried and burned. For every tree that dies from that disease two more trees should be planted out. Give slugs a dusting of dry lime, or dash them off with dry and or powdered soil. Thin out fruit on overbearing trees.

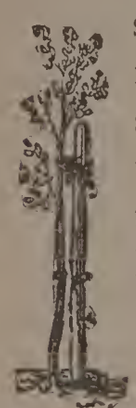


Fig. 354. Mode of Staking up Young Trees.

Shorten back new shoots on the blackberry. Rub off early in the month all supernumerary shoots on out-door grape vines. Thin berries or vines in heated grape houses, and pinch back laterals on those in cold houses. Keep up a mild, damp atmosphere.

Strawberry beds should be kept moist. Larger fruit and heavier crops will result.

It is now an excellent time to shape a permanent form to the heads of young trees.

Mulch the surface of the earth around newly transplanted cherry trees.

WORK FOR JULY.—Continue the operation of cultivation to prevent the growth of weeds and the formation of a crust on the soil. Mulch all young trees when cultivation cannot be given. Thin out supernumerary branches on grapevines, pinching back canes and bearing shoots that are becoming too long, and thin the bunches and take out imperfect berries.

Fig. 355.—Layering Grapes.

Perform the operation of summer layering the grape early in the month. These layers will consequently be furnished with plenty of roots from the joints before winter, when they may be cut from the parent vine and taken up, each layer usually forming two plants.

Transplant strawberries. Continue the operation of pinching back the side and end shoots of blackberries. Cut down the old canes of raspberries as soon as bearing season is over, and then thin out the new ones. Commence budding all trees that have well-formed or matured buds—the cherry usually first, then the plum and pear. Watch for insects. Keep a good lookout for peach worms and apple-borers, and cut out black knots, and cut back fire-blighted branches, as directed for June.

Secure choice cherry stones for planting, by mixing the washed seeds with moist sand before they have dried.

Give a good supply of air to ripening fruit in heated grape-houses, which will be the means of securing both color and flavor. Thin the forming bunches in cold houses, and remove defective or diseased berries and crowded shoots, and guard against cold currents of air.

WORK FOR AUGUST.—Continue the operations of last month. Destroy weeds; keep the ground mellow about young trees; pinch off shoots that are becoming too long in young trees and blackberry bushes; mulch trees that are suffering from drouth, and transplant strawberries according to directions for July.

Watch for insects, and especially for aphides or plant lice, which increase rapidly this month. Destroy the latter with strong soap-suds or very strong tobacco water. Keep a constant lookout for the black knot on the plum, and fire blight on the pear tree, and at once cut off all the affected parts.

Continue budding, finish cherry, plum and standard pear, and commencing early on apples, mahalebs, peaches, and quinces may be budded towards the close of the month. Keep an eye on budded stocks, and remove ligatures as soon as they cut the bark.

Gather early pears for house-ripening. Be careful that you do not bruise them.

WORK FOR SEPTEMBER.—Finish the operation of budding the peach and quince stocks, and timely remove the ligatures. Keep new strawberry beds entirely free from weeds, and unless intended for increasing the plants, cut off the runners. Prune out the useless wood of young trees, and give a good shape to the forming heads, the growth being now nearly at an end no check will be given to the tree.

Keep the soil of the orchard ground in good condition.

WORK FOR OCTOBER. — The work of transplanting should now commence. In transplanting, the soil should be naturally dry, sheltering the young trees from wind, and staking them firmly, or by making small compact embankments about the stems. See April for more complete directions for transplanting.

The chief and most important work for this month is gathering fruit. Full directions will be found elsewhere for this work, and should be carefully followed. Grapes should be gathered, and they should be well ripened. For keeping grapes, see elsewhere.

Fig. 356. Mode of banking against newly set trees.

TOP DRESSING orchards may be performed any time during this month.

GRAPE-VINES in green-houses should have their growing shoots pinched in, and vines in cold houses, as soon as the fruit is picked, should be thrown open and exposed to the air, to finish the ripening of the wood.

WORK FOR NOVEMBER.—Transplanting may be continued any time during the present month, when the weather is mild and not freezing. Carefully register in a book the names of every sort in the orchard, and this record may be referred to at any time in the future when the labels have disappeared. Young trees in windy places should be either staked or stiffened against the wind by a mound of earth. See October. For directions to exclude mice from young trees, see elsewhere.

Trees received late from a distance may be heeled in for spring planting. If received in a frozen condition, bury them immediately in mellow earth, and the frost will be gradually abstracted from them without injury.

Protect half-hardy raspberries by bending down and covering slightly with earth. Cover strawberry beds with coarse stiff straw, or with corn stalks or evergreens. Grape-layers should be separated from the vine and pruned, and packed away in moss, or heeled in earth.

Fig. 357. Bending down Raspberries for Covering.

Cuttings of quinces, gooseberries, and currants, should be made and treated in the same way. Cut grafts for spring use, carefully label each sort, and pack away for winter. Stocks for root-grafting are to be taken up and packed in boxes in cellar for winter use.

Plough between nursery-rows to carry off surplus water in winter.

WORK FOR DECEMBER.—Carefully examine the directions for November, and promptly finish up all jobs not completed in season. Complete the cutting of grafts; apply winter mulching to young trees; top-dress with manure the ground about young trees that needs enriching; collect stakes, tallies, labels, etc., which are out of use, which tie up and put carefully away. Examine the directions for work for January, and perform any operations that may be required.

IN EARLY GRAPE HOUSES the vines pruned last month will begin to swell their buds. Give during the present month a regular and moderate tem-

perature. Prune vines in green-houses and cold houses, and protect the latter with a covering of leaves.

DWARF APPLES.—It is possible that the dwarf apple may become more popular than the dwarf pear. It is not liable to the accidents of the latter.

All sorts of apples grow freely on the dwarf stock, and it is not necessary to take that particular care in selection, founded on many years of experience—although some sorts of the apple form handsomer and better shaped heads when treated as dwarfs than others. The symmetrical growers should be selected, because they make the process of pruning simpler, and more easily give the desired shape.

Common standard apple trees occupy too much room for gardens and small places. At the commonly recommended distance, 33 feet, only 40 can stand on an acre, and placed at the nearest distance admissible, 25 feet, an acre is required for 69 trees. A quarter-acre village garden can therefore have only 10 trees at the former, and 17 at the latter named distance, if apple trees occupy the whole ground. But dwarf apples may stand about four times nearer, giving sixteen times as many trees on the quarter-acre. If, therefore, one-half the quarter-acre garden is occupied with dwarf apples, 85 trees may be planted at eight feet apart, a suitable distance for the Doucain dwarf, or 150 at six feet apart, the space for the smaller or Paradise dwarf.

The best varieties for dwarf stocks, as a general rule, are those which naturally form a round or oval head. Such will need but little pruning. Among these are the Red Astrachan, Jersey Sweet, Porter, Baldwin, Dyer, Monmouth Pippin, Summer Rose, Benoni, and Sweet Bough. There are others that incline to grow upright, and need some pruning to prevent their running upwards, and to induce spreading; among these are the Northern Spy, Twenty Ounce, Lady Apple, Wagoner, Early Strawberry, and Bailey Sweet, all of which make handsome dwarfs. There are others again, although not so handsome growers, yet the ornamental appearance of the fruit renders them desirable dwarfs, as the Fameuse, Red Canada, Carolina Red June, Munson Sweet, etc. There are still others, which grow so irregular that some care would be required to make handsome trees of them, such as Fall Pippin, Canada Reinette, and Tompkins County King. Dwarf apples should be mostly confined to summer and autumn varieties, in order to furnish a fresh supply for the table of the most desirable sorts.

Winter apples may be most profitably raised in orchards of large trees, or purchased in market by the barrel

Dwarfs are especially desirable for those who plant new places, and consequently desire an early return. The Paradise Stock will give crops the

third year; and the Doucain the fourth, in abundance. A fine young collection of dwarfs, now four years planted, and growing their fifth summer, bear much better during an unfavorable season than old orchards. Some of the trees are loaded. A Hawthornden is so full that the branches densely set with apples lie on the ground with their loads of fruit, now in the second year of such profuse bearing. The Doucain trees are about 7 feet high, and the paradise 5 to 6 feet. The soil is fertile, and always well cultivated.

APPLES—For stock.—Never throw away windfalls or poor apples, or allow them to waste, no matter how abundant the crop may be. Moderate and regular quantities fed to milch cows late in the fall and in winter, will improve their condition and appearance, and increase their milk. The health of horses will be improved by a portion of this succulent food, when confined to hay and grain. The richer sorts of apples are excellent for fattening and keeping store-pigs. Fed to sheep in connection with hay and grain, they produce an excellent effect. Provide, therefore, ample dry bins in your barn and other cellars for storing these refuse apples, and they will save a vast amount of grain.

APPLES—Thinning.—Remember that it is not more than one-fourth the labor to thin out the small, defective, scabby or stung apples, when they are quarter grown than to hand-pick and assort them next autumn—and the selected specimens which are left have a better chance to grow, and sell at a higher price in market.

FRUIT—Keeping.—Apples packed in calcined plaster rotted very badly and quickly. The dry plaster absorbed enough moisture from the apples to dampen it and get up a degree of heat sufficient to spoil the fruit. Dry earth kept apples in fair condition to appearance, but the flavor was spoiled. Buckwheat chaff had been found excellent for packing fruit, as it contains very little starch. Wheat bran is objectionable on account of its abundance of starch, which soon moulds and spoils the fruit. Dry forest leaves have been used with fair results for packing apples. Oak leaves are among the best for this purpose. Several bushels of fall apples having been stolen by a hired man, were buried in a large hay mow and then deserted for several months. In mid-summer they were discovered and found in a very good state of preservation. Taking a hint from this, fifty barrels of winter apples are now packed in straw, in a cool dry cellar, as an experiment. Apples are so cheap and plenty generally that it costs very little to try an experiment, which if successful, may prove of great value. Cellars should be ventilated at the bottom, that the whole of the air may be changed. A brick taken out from the bottom of the chimney flue makes a good opening for the escape of damp air in a cellar. Dry sand had been successfully used for keeping grapes from harvest time till winter.

Fig. 358. Pruned and plowed blackberry bushes.

BLACKBERRIES—Culture of.—Blackberries always command a good price and a ready market. They are often grown at little expense, on rough ground, useless for many other crops, and may be pruned with hedge shears and bush scythe, in case other implements are not at hand. Within the past few years the blackberry has demanded more attention than formerly, and the fruit improved greatly.

Fig. 359. Unpruned blackberry bushes.

BLACKBERRIES—Straightening up.—The Kittatinny blackberry, which we believe to be the most hardy, and which in winter need not be laid down, requires, however, care to keep it within bounds and proper shape. If this is neglected it grows in the form shown by fig. 360, and usually more spreading than the figure. It requires, as every good cultivator knows pinching in during its growth in summer, to keep it snug and compact and to induce abundant bearing. But even after full pinching, the stems often lean over as shown in the figure, and should be well straightened up in spring. Those which have not been pinched, should be cut back so as to appear like fig. 361, which shows the size and form of the bush after summer pinching. It may then be readily and firmly straightened up by taking out one spit of earth from the upper side, as represented, when a pressure of the foot on the opposite side will place it erect, as in fig. 362. The earlier in spring the better for this work, but it may be performed at any time before there is much new growth. Rows of blackberries, instead of spreading six to eight feet on either side, catching the clothes of every one who passes, and becoming a nuisance in the opinion of all who never saw them properly kept, ought to be brought into as compact and unobtrusive a form as a currant bush.

Fig. 360.

Fig. 361.

Fig. 362.

BLIGHT IN FRUIT TREES—To cure.—A smothering straw fire should be made early in October, in calm weather, under each tree, and kept up during an hour or more. This done, scrape the moss and other impurities from the trunk, and from every obscure hole and corner; set your ladders to the branches, carefully cleaning them in the same way, taking from the remaining leaves every web or nidus of insects. If need be, wash the trunk and all the larger wood, with a solution of lime and dung. Last of all, it is necessary to destroy the insects and eggs which

may be dropped upon the ground, and it may be useful to loosen the soil in the circumference. In the spring or early blighting season, apply your ladders, make a careful survey of every branch, and act accordingly; repeat this monthly, picking off all blights by hand, and using the water-engine where ablution may be necessary. To those who have fruit, or the market profit thereof, every orchard or garden, little or great, will repay such trouble and expense.

CRANBERRY—Culture of.—The cranberry has become an important fruit in the markets of the country and is successfully cultivated between 38 degrees and 45 degrees north latitude, but its cultivation will extend further south in the mountain ranges. The best location and soil consists of peat and muck bottoms, coated with pure sand obtained from adjacent banks, and the ground prepared in the manner to be capable of being flooded with clear running water at any desired time in winter, and at other times thoroughly drained. Drift soils have proved successful, but not as productive. Care should be taken against muddy water running over the plants, as it causes injury.

Fig. 363. Bugle Cranberry.

Fig. 364. Bell Cranberry.

In preparing the soil clean off all wood and rubbish, and remove the surface or "turf" with a hoe made for that purpose. Then provide drains by clearing out the main water course and making parallel open ditches at regular distances of about 2 rods. The whole surface should be then covered from 4 to 5 inches with as pure sand as can be obtained, which can be gotten from the adjacent banks and conveyed in dump-cars, run by hand on portable and movable wooden rail-tracks. An embankment or small dyke surrounds the whole and allows the plantation to be flooded at pleasure.

Fig. 365. Cherry Cranberry.

SETTING THE PLANTS.—After sanding, the plants are set in rows about two feet apart. Some prefer a greater distance, to admit more freely the passage of a horse cultivator. They should be ten or twelve inches apart in the row.

FLOWING should be continued from December to May, and furnishes, among other advantages, protection from insects as well as from early frosts.

The plantation should be carefully kept clear of weeds for the first two or three years, after which, if well managed, the cranberry plants will cover the surface and render this labor comparatively light.

GATHERING THE FRUIT is begun in September, and lasts several weeks Good pickers will gather three bushels a day.

CHERRY TREES—YOUNG.—A large portion of newly transplanted cherry trees die about midsummer, after having appeared in leaf, resulting from dry and hot soil at the roots. Water often increases the difficulty, and kills them by making a hard crust. If water is applied at all, the earth should be first removed from the roots, and a copious supply poured on. But this too is of little use. The roots are drenched for the moment, and in a short time are as dry as ever. The only remedy is a thick, heavy mulching. If of old straw, it should be about 6 inches thick, and several feet in diameter.

DRAINING ORCHARDS.—It is best to place underdrains *between* the rows of trees—because, first, the large roots sometimes run down and injure or derange the channel; and secondly, because it is the space between the rows that is covered by the great mass of small fibrous roots, which furnish the nutriment to them. As dwarf pears do not send roots so far nor so deep, they may be set directly over the drain if desired.

THE FIG.—The fig may be raised in open ground without protection in most of the States south of Virginia. In the Middle States it requires more or less protection in winter, for which purpose it is kept as a low bush by means of pruning the branches and roots. As far south as Virginia, the trees are covered with inverted boxes or large barrels, or protected with a mass of evergreen branches; and when this is insufficient, the boxes or barrels (open above and below) are filled among the branches with dry leaves, or small branches or leaves of evergreen trees. At the North, figs may be raised in sheltered situations, the trees to be laid down on the earth for winter protection, and covered with several inches of dry soil, or a dense mass of forest leaves or evergreen boughs. More commonly, however, they are kept in tubs or boxes.

The trees may be propagated by seeds, layers, cuttings, and suckers. As the seeds do not uniformly produce the same sorts, they are to be employed only for obtaining new varieties. In the South, spring cuttings of

last year's growth are taken off and set in February; and summer, or green cuttings, in August. If the latter do well they will bear the following year. At the North, the hard-wood cuttings are taken off late in autumn, and kept moist in a cellar till spring, and then set out. The green or summer cuttings, which should be only a few inches long, root best with bottom heat.

The soil should be supplied with a medium amount of moisture. If too dry, the trees will drop their fruit; if too moist, the growth will be too rank and succulent, and the trees bear thin crops.

The fig bears two principal crops, the first in spring, the second towards the end of summer. Novices are puzzled to see the spring figs make their appearance before either leaves or flowers are seen—the explanation of which is, that the fruit is only a fleshy receptacle, the inside of which contains the numerous minute flowers.

FIRE-BLIGHT IN THE PEAR.—Gen. Negley informed the writer during a recent visit at his residence, that a near neighbor had very successfully treated his pear trees, which had been struck with the fire-blight. He had at first adopted the common practice of cutting off the affected limbs as far down as the disease appeared to extend, and not, as so frequently recommended, amputating two or three feet below, or beyond the reach of the descending poison. The neighbor here alluded to then changed his mode of operation, and as soon as he discovered the disease in possession of any of his trees (which were some ten years old, and three inches in diameter,) he immediately cut them down to within a foot or two of the ground. The season being about midsummer, when the early summer growth had ceased, and when that severe check would not be given to them that would result if done when in rapid growth, they sent up new shoots the following spring, and every one thus treated has formed a fine healthy pyramid; while those managed in the old way nearly all perished.

FRUIT TREES—Sprouts about.—These often become troublesome and unsightly. It is a common practice to cut them off at the surface of the ground. But this leaves many dead stumps, and the sprouts soon spring up again. The best time is to remove them early in summer, when they will be less likely to grow again; and if they are not too large, they may be pulled off with the hands, assisted by one foot (in a thick boot,) placed between the sprout and tree. If they are too large, or too low down, to be taken off in this way, then the earth must be scraped away so that they may be cut off close to the tree.

FRUIT TREES—To prevent from splitting.—For preventing forked trees from splitting under their weight of fruit, a correspondent has given the *Prairie Farmer* his plan. "My plan," he writes, "which I have fol-

lowed for thirty years, is this: when I find a forked tree that is likely to split, I look for a small limb on each fork, and clean them of leaves and lateral branches for most of their length. I then carefully bring them together and wind them round each other, from one main branch to the other. In twelve months they have united, and in two years the ends can be cut off. The brace will grow as fast as any other part of the tree, and is a perfect security from splitting. I have them now of all sizes, and I scarcely ever knew one to fail to grow.

FRUIT TREES—MULCHING.—A correspondent of the *Horticulturist* planted 150 trees in an orchard in very good but rather dry soil. All were planted with equal care, but a third of them were *mulched*, or the surface of the ground when planted covered with six inches of litter. Those thus treated all lived; but fifteen of those not mulched died in the hot dry weather of midsummer. It is not stated that the soil was kept clean and mellow around them, which will often save the life of trees, when they would die of neglect.

FRUIT LADDER.—An improvement in the common tall step-ladder is made by attaching a basket support to the right hand board. This support is made of an iron rod, about half an inch in diameter, and bent when red hot in the shape shown at *a*. This is inserted in the two holes shown in the ladder (fig. 366,) so that the two ends pass closely below the step, which holds them firmly. On this the basket is set, and both hands are then at liberty to work, which is a great advantage when the limbs must be held for picking. Smaller rods may be used if pieces are welded across at one or both places shown by the dotted lines.

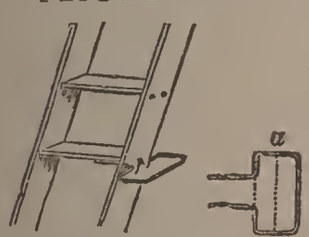


Fig. 366.—Fruit Ladder.

GOOSEBERRIES.—The best English gooseberries, for this country, are Crown Bob, fig. 367, and Whitesmith, fig. 368. The accompanying figures represent the natural size and form of these gooseberries when fully grown, on well pruned bushes, standing in good cultivated soil. As commonly cultivated, they are about half this size. But a serious objection is their liability to mildew after bearing one or two crops; an evil that may for a time be averted by good cultivation and pruning, and mulching in summer. The most valuable gooseberry, however, for common culture, all things considered, is Houghton's. It grows freely, is easily propagated, and in most localities never mildews. It is a profuse bearer.

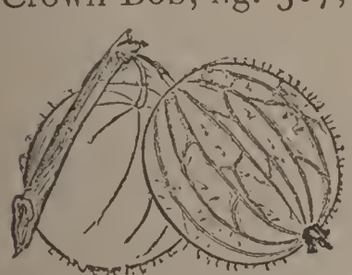


Fig. 367. Crown Bob.

Fig. 368. Whitesmith.

The cut, fig. 369, shows a portion of a branch, with berries of the average size under common culture. Branches loaded as densely, a foot or two long, are generally found on every bush. Under pruning and high cultivation, with some thinning of the berries, they grow larger. The Mountain Seedling is similar, larger, but with thicker skin. There are two or three sub-varieties, among which is the American Seedling, very nearly resembling the Houghton. A spurious sort has been widely disseminated under the latter name.

The Houghton gooseberry is an excellent sort for bottling for winter use.

Fig. 369.
Houghton's Seedling.

The process is exceedingly simple and easy, no heat nor cooking being required. Pick the berries while yet *quite green*, and before the ripening process has even commenced. If done later they will not keep. Clip off the stem and calyx with sharp scissors, and pack them in glass jars, shaking them down well, and pressing them closely, but not so as to crack or injure them. Then cork them, rendering the bottles tight with grafting-wax or sealing-wax. Place the bottles in a box in a cold cellar, imbedded in dry saw-dust. They will be in fine order the following winter.

GRAFTS—Plum—Which are sometimes injured by intense cold, are generally better if cut before the approach of the severest weather, and securely packed away.

GRAFTS—Cutting.—The best time to cut grafts is at the commencement of winter. In cutting and packing them away there are various precautions that should be observed. In the first place let them be amply and distinctly labelled, as it is very annoying to find the name gone at the moment of using them. For this purpose they should be tied up in bunches not over two or three inches in diameter, with three bands around each bunch—at the ends and middle. The name may be written on a piece of pine board or shingle, half an inch wide, a tenth of inch thick, and nearly as long as the scions. This, if tied up with the bunch, will keep the name secure. For convenience in quickly determining the name, there should be another strip of shingle, sharp at one end, and with the name distinctly written on the other, thrust in the bundle, with the name projecting from it. If these bunches or bundles are now placed on ends in a box, with plenty of damp moss between them and over the top, they will keep in a cellar in good condition, and any sort may be selected and withdrawn without disturbing the rest, by reading the projecting label. We have never found sand, earth, saw-dust, or any other packing substance, so convenient, clean and easily removed and replaced, as *moss*, for packing grafts. It is

needful, however, to keep an occasional eye to them, to see that the proper degree of moisture is maintained—which should be just enough (and *not a particle more*,) to keep them from shriveling. They must. of course, be secure from *mice*.

GRAFTING KNIVES.—A correspondent of an agricultural paper who nas practiced pruning for thirty years, gives the following drawings of grafting knives. He says:

There is a great gain in using a tool best adapted to its work, and I think those acquainted with fig. 371, will, after an explanation of its advantages, desire to procure it. Fig. 370 is taken from the April number of the *American Agriculturist*. Fig. 371 is the knife used by most Western grafters. I have handled both. The wedge point *a*, should be made of steel, well tempered, and not of iron (as was the one I purchased, and which gave me much trouble by bending,) for the point, in pressing open the slit just before placing the graft, receives a considerable strain.

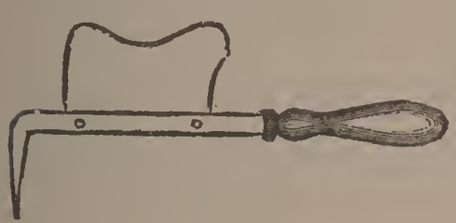


Fig. 370.

Fig. 370 would be as good as fig. 371, if you could always be in a favorable position to handle it; but limbs are sometimes very difficult to get at. In such cases, fig. 371, from its form, is preferable, and a man can in a day accomplish more with it, and with greater ease, for in driving in the wedge point *a*, there is no projecting knife-blade in the way of your mallet (which should be a round piece of hard wood,) to interfere with the direction of the blow, or worse still, in some awkward positions there is a risk of hitting your hand against the blade. I mention this feelingly. Fig. 371 is frequently made too thick in the blade, but when properly made, is a very satisfactory tool to work with, much more so than the other, according to my experience.

Fig. 371.

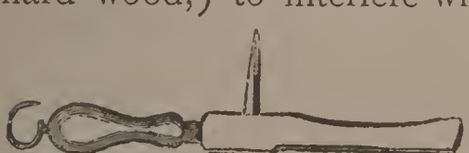


Fig. 372.

Another correspondent of the same paper says: I send you a rude draft of a good grafting-knife and chisel, (fig. 372.) Those who have used them, say that the advantage of this form is in having the instrument balance when the wedge is in the stock, so that it does not fall out. The hook is for hanging on a limb.

GRAPES—Overbearing—Do not allow grape-vines to overbear. Many a young vineyard has been injured, if not ruined, by carrying too much fruit. Novices often delight to show how many grapes they have on their young vines, and to tell how many tons per acre their new vine-

yards have yielded. Thin out the bunches as soon as they have set, and let the crop be small. It will be all the better in quality, and the vines will preserve their health and vigor.

GRAPE TRELLIS.—In answer to several inquiries, we give the annexed cut (fig. 374,) representing the mode of constructing wire trellis for grapes.

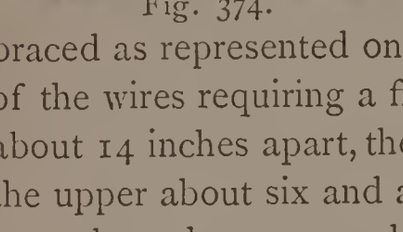


Fig. 374.

The posts are white cedar, mostly round and rough; they are set in the ground about two and a half feet, are seven feet high above ground, and twelve feet apart. At the ends, they are braced as represented on the left portion of the figure, the powerful stress of the wires requiring a firm support. The wire, which is No. 10, is placed about 14 inches apart, the bottom one about two feet from the ground, and the upper about six and a half to seven feet high. At the ends the wires pass through or around the posts; they are attached to the intermediate ones by staples. The vines are trained on this trellis mostly in the fan form, and where necessary are fastened to the wire by cotton cord.

The cost of this trellis is 75 cents to one dollar per rod. The cut represents only one length between posts, besides the end bracing.

GRAPES—Pyramidal training of.—C. A. Brackett, of Winchester, who has uniformly exhibited the finest specimens of the Diana grape, trains them each to a stake, and gives them the pyramidal form. The soil is first trenched two feet deep, and stakes eight feet high are set seven feet apart, a vine planted at each end and immediately cut down to two eyes. The first year two shoots are allowed to grow, and are carried up spirally, both in the same direction, about five inches apart, around the stake, till they reach the top. The laterals grow at random. They are pruned back in the fall to eighteen inches, and the laterals to one eye. The second year, two shoots are carried up as before, from the two upper eyes, the laterals requiring summer pruning. In the fall, the vines are cut back to within eighteen inches of last year's wood. This course is continued till the vine permanently covers the whole of the stake or post—whatever surmounts it is cut back. The fruit is borne on the side shoots, the pruning is done on the short-spur system, and a handsome pyramidal form is given to the whole.

By this system the vine is kept at *home,* light and air have easy access, the buds break easily, the flow of sap is equal and natural, and when once established the vine requires comparatively little care.

Little or no manure is used—a few feet of short-jointed wood being preferred to a longer growth from a heavy use of animal matters—doubtless different soils require different treatment in this respect. The Diana thus treated, has proved "a great grower and free-bearer—the bunches of good size, and the berries large, some of them measuring *seven-eights of an inch in diameter.*"

The size of these supports must vary with their intened purposes and with the character of the variety. If for permanent bearing, or to continue twenty years or more, they should be much larger than for a few years trial. The Delaware and Rebecca do not need support so large as the Isabella and Concord. The latter, to afford ample room, should be twelve feet high or more, and the side limbs should extend about three feet at bottom, and be shorter as they approach the top. If the part which enters the ground is well coated or soaked in gas tar, this part will last as long as desired.

REGISTERING ORCHARDS. — Planters who have set out young orchards should not forget to register the names of all the sorts in a book. It may be done in a common account book, and will then be always at hand, and ready for reference. Commence with a row on one side and proceed regularly to the other; in this way every tree may be found. Planters receive their trees labeled from the nursery, and carefully observe every kind; but in two or three years they forget them, the labels being lost or defaced, and when the trees bear the first specimens, are puzzled to know what they are. They call on some wiseacre, who gives half the names wrong, and misnomers are thus multiplied. Now is the time to register them.

PEARS ON APPLE-STOCKS.—It is very rare that pears succeed well on apple-stocks. Sometimes they will give much promise for a year or two and then fail. The Winkfield and Summer Bonchretien, will often grow freely for a few years. We have raised about one peck of fine Seckles pears on a small tree on apple root, five years old, but the union being imperfect, it broke off at the surface of the ground. We cannot recommend the practice, except to those who are fond of unsuccessful experiments, often not one in a hundred succeeding after the first year or two.

PEACH—Grafting the.—This, in the Northern States, requires great skill for its successful performance, but at the South where growth is so much more rapid, and other influences more favorable, it is comparatively easy. In a late letter from Robert Harwell, of Mobile, long known for his skill in fruit culture at that place, he gives the following results of his practice: "I propagate all my peaches by grafting, beginning in November or December, and if the stocks and grafts are good and the grafting well done, I do not lose over five in a hundred. I have my grafting done at the house, and plant the grafts like cabbage plants. I formerly budded, but found it very troublesome, and have entirely abandoned it."

PEARS—To color.—Josiah Hoopes, the well known West Chester, Pa., nurseryman, says that to give a high color to pears "all that is necessary will be to spread a blanket on the floor of a cool room, and then thinly

and evenly place the fruit on the floor. A second blanket must be spread over them, and in a short time the effect of this treatment will be apparent in the most golden colored Bartletts, and rich, ruddy-looking Seckles imaginable. Pears perfected in this manner rarely have the mealiness of their naturally ripened companions; nor do they prematurely decay at the core, as when left on the trees."

PEAR TREES—PROTECTING THE TRUNK OF.—Orchardists are familiar with the disease that affects the bark on the bare trunks of standard pear trees, particularly at the South and West, where there is so much hot sun at mid-day. The *Northwestern Farmer* states that a fruit-grower has for several years protected his trees against the hot sun by adjusting a board to shield them from the two o'clock rays, with entire success—adding that "since he has tried it, he has lost no more trees, the bark on that side remaining as smooth and as soft as on any other part of the tree."

DISTANCES FOR PLANTING TREES, ETC.

	FEET.		FEET.
Apples, standard	25 to 33	Plums, standard	15
Apples, dwarf	5 to 8	Plums, dwarf	8 to 10
Pears, standard	20	Quinces	6 to 8
Pears, dwarf	8 to 10	Grapes	10 to 12
Peaches, headed back	12	Gooseberries and Currants	4
Cherries, standard	20	Raspberries	4
Cherries, dwarf	8 to 10	Blackberries	6 to 8

For the above distances, the following is the number of trees required for an acre:

At 4 feet apart each way	2,720	At 15 feet apart each way	200
At 5 feet apart each way	1,742	At 18 feet apart each way	135
At 6 feet apart each way	1,200	At 20 feet apart each way	110
At 8 feet apart each way	680	At 25 feet apart each way	70
At 10 feet apart each way	430	At 30 feet apart each way	50
At 12 feet apart each way	325	At 33 feet apart each way	40

GRAPES—RULES FOR PRUNING.—*Hovey's Magazine* gives substantially the following general rules for grape pruning, after recommending grape-growers to be free in the use of the knife, followed by the remark that where one vine is pruned too severely, nine are not pruned enough:

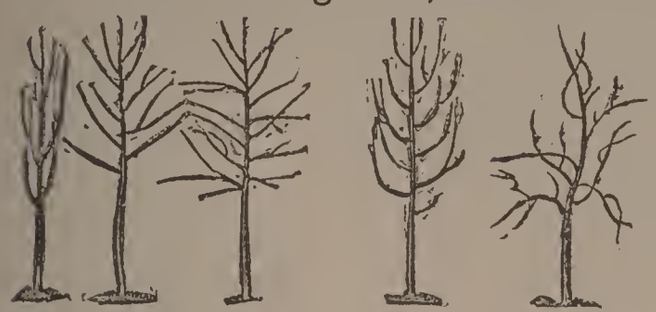
1st. No shoots should be nearer than one foot from each other.

2d. Prune back to within one eye of the old wood, every fall and spring, about one-half of the annual shoots—the remaining eyes producing canes to be retained for bearing next year—when the old bearing wood is in turn to be cut out, to make room for new shoots.

3d. Disbud or rub off, as soon as they appear, all shoots not wanted as bearing wood.

PEAR TREES.—In the different varieties of the pear there are many

different modes of growth, which should be well understood by those who would raise and train them successfully, each variety requiring its peculiar management. A straight, upright growth, fig. 375, as the Buffum, and also the Bartlett, although in less degree, should prune them in such a manner as to give them a more spreading form. The upper shoots should be cut back more freely than in other trees; and, in making a cut, let it be done next above a bud which stands on the outside of the shoot. In removing supernumeraries cut out those which are most upright, leaving those which have a diverging tendency, so far as can be done to advantage. It is proper to remark, however, that less care need be taken with the Bartlett and Buffum than with some other kinds which are less productive, as both of these are such heavy bearers, as to give the branches a diverging tendency after two or three years, the great point being to prevent the tops from running up too high.



375. 376. 377. 378. 379.

Those sorts whose shoots are diverging, as in fig. 376, as in the Seckle, Washington and Boussock, do not require the special care just described, but only enough to preserve a handsome, even head.

Where the branches are spreading, as in fig. 377, as seen in the Lawrence, the pruning adopted in the first instance should be rather reversed, by cutting out such shoots as have a tendency to droop, and leaving those of a more straight and upright character. This care is especially required for the lower branches, where horses are used for cultivating the orchard.

Varieties with ascending shoots, or those which curve upwards, as in fig. 378, instances of which occur in the Tyson and Onondaga, require nearly the same care as in the case of 376. They mostly form handsome heads with very little care, except the removal of one-sided branches. and in preserving even distribution.

Fig. 379 represents the straggling growth seen in the Winter Nelis, Black Worcester and Beurre Giffard. If these sorts are worked on the stocks as usual, near the surface of the ground, they require much staking to make even tolerably straight stems. Much better trees may be made by grafting or budding them at standard height into such straight varieties as the Buffum. In this way, with the addition of keeping the head in good shape, we have succeeded in making handsome trees of this sort.

PEARS—Pruning dwarf.—It is well known to every intelligent fruit culturist, that there have been many failures with Dwarf Pears. With the bad manner in which they have been managed, it is surprising that there should

not have been more. Other kinds of trees, as the apple, peach, and cherry, have been generally treated with utter neglect, and yet some of them have survived and given tolerable returns. Presuming on this success, most planters are determined to compel dwarf pears to submit to the same treatment.

A dwarf pear tree should never be planted at one year old. A good one-year-old tree consists of a single upright shoot or stem, from three and one-half to five feet high, and should be cut off at about two feet from the ground; and in order to give a smooth, handsome stem or trunk, let the buds be rubbed off to the height of one foot from the ground—leaving on the upper portion six to nine buds, more or less; with the tree standing in its original position in full vigor, and cut back as above stated, each one of these buds will throw out a good strong branch, which gives a full, round distaff form to the tree; and is the time and manner, and the only time, when that desirable shape can be given, on which the future form of symmetry and beauty so much depends; and to avoid what is termed a crotched or fork-topped tree, in which the two uppermost branches are about of equal vigor and height, let the second branch from the top be pinched off, when about nine inches or a foot long, which will check and weaken it, while the uppermost one becomes a strong central leader. Whereas, if the tree be transplanted at one year old, and cut back as above stated, the vital forces of the tree will be weakened half or three-fourths by transplanting, and as the result only two or three (more or less,) of the buds on the trunk, will grow so as to form branches, and they perhaps only at the top or all on one side, while the remaining buds remain dormant, never afterwards to be developed, as the other branches form new channels, which will more readily carry the sap to the other and upper portions of the tree.

For transplanting, therefore, let a tree be two years old from the bud, well cut back at one year old, and with six to nine main branches, which form the frame work or foundation, which is to give form and character to the future tree, with proper care and management.

Fig. 380.

The annexed cut (fig. 380) will illustrate a two-year old tree, as above described, its lower branches about one foot from the ground, its upper branches being the strongest and most upright, and those below less vigorous and more horizontal.

Fig. 381.

I speak of this more particularly, for the reason that all the cuts which I have noticed in works on Pomology, and in agricultural papers, represent a two-year-old tree with branches

much the longest and strongest at the bottom, and diminishing in vigor towards the top, except, perhaps, the centre top branch; while all experience illustrates the principle that the sap flows most freely and readily to the upper branches, giving them vigor, strength and uprightness, to the diminution of the same characteristics in those below.

The dotted lines indicate where the branches should be cut back at the time of planting.

In cutting a tree, with branches formed as above described, let the leader be cut down within four to six inches of the place where the one-year-old tree was cut off, and just above a good bud on the side of the tree, over the previous year's cut, thus keeping the leader in a perpendicular position over the original trunk or bottom of the tree.

If the side branches are too horizontal, upper buds are left for their extension; if too upright, lower buds are left. Side direction may be given, if desirable, to fill wide spaces, in the same way. Cut the other branches at such a distance from the trunk, that the ends of all of them would form a pyramid, the base of which should not be over twelve to sixteen inches in diameter, and in smallish trees much less; thus the lowest branches will be left the longest; the object of which is to check the natural flow of sap to the upper branches, and induce it to flow more forcibly to the lower ones, increasing the vigor and force of the latter as much as possible, which must be done at that time, or never.

Fig. 381 represents a two-year-old tree after it has been pruned at two years old, and made the third year's growth, and showing where it should be cut back at that time. All subsequent pruning will become easy to any one who has attended to these directions thus far.

A correspondent says: "Experience has convinced me, that with good trees, of well chosen varieties, on any good corn land, which is never too wet; and with the culture a good farmer gives his other crops, and the important—nay more, the indispensable requisite to success—*thorough pruning*, no one need fail of attaining a degree of success highly satisfactory and profitable."

QUINCE—Pruning the.—Of all trees that suffer from neglect, none is more so than the common orange quince. Generally, the trees receive no care at all, but grow up a thick mass of brush. In this condition, they bear sparingly a small, poor fruit. Such masses of growth may be thinned by cutting out all the crooked and close growing shoots, and by cultivating the soil, they will then yield more and better quinces. If, however, they are kept in the neat, low tree form (shown in fig. 382 with open thrifty heads, and old manure or a compost of manure and muck and

Fig. 382.

some ashes applied and well worked into the cultivated surface, the fruit furnished will be much greater in quantity and incomparably finer.

RASPBERRIES — CULTURE OF. — The raspberry is a paying fruit to any one who will give it attention after fruiting; the old canes are to be cut out, the ground plowed and hoed, the stakes removed or sheltered, or stacked in the field, and late in the autumn the young plants in the hills are removed, and the canes left are bent down and slightly covered with earth for winter protection. They are mostly planted three or four canes in a hill, four or five feet apart each way; closer than this will not do. Cut back to a few inches high when first planted to prevent bearing, and secure a good growth the first year. They hardly, before the third year, produce a full crop, but they continue bearing for many years.

Fig. 383.—Hill of Raspberries when first tied to stake in spring.

Fig. 384.—Raspberries bent down and held with a shovel of earth till covered with plow for winter protection.

The worst enemy of the raspberry, as well as the strawberry, is the white grub, which should be searched out and destroyed.

GRAPE——ROOT-GRAFTING THE.—This mode of propagation is becoming extensively adopted by nurserymen. The accompanying figure shows how it is done. The cleft is made in a short graft, and a small root an inch and a half long, is inserted (fig. 385.) The parts are bound well together with strips of waxed paper, leaving a small portion of the lower end of the graft open, for the free emission of roots. They are then subjected to a bottom heat under glass, and soon make growth. They are transferred to pots once before being set out in the open ground, and they make good saleable plants by autumn. The grafting is done about midwinter or later.

Fig. 385.

APPLE—ROOT-GRAFTING OF THE.—The following method of root-grafting is given by a nurseryman who has had a large practice, and, if followed, any one can meet with success. The tools consist, 1st, of a sharp, thin-bladed knife, the best of which is made from the blade of an old scythe, ground down to the right shape on a grindstone. 2d, a bench or table placed in front of a light window, and on which the work is done. 3d, an apron, worn by the grafter, the two lower corners being hooked fast to two sharp nails on the near edge of the table, for holding the scions while cutting them. 4th, strips of waxed paper, about an inch wide, made by brushing over sheets of thin, tough paper, a melted, well-stirred mixture of four

parts of rosin, two of tallow, and one of beeswax, and then cut into strips when precisely at a proper degree of coldness to separate well by means of a knife cutting upon a smooth board. A sufficient number of these for immediate use, should be hung near enough to the stove which heats the room, to keep the wax upon them about the consistence of butter on a summer day, so as to fit and adhere to the grafted root, without melting and running.

The first operation is to cut up the grafts from the shoots or scions. It is performed by holding the scions in the left hand, the thicker end pointing toward the right hand, which holds the knife. Such a shoot is represented, of diminished size, by fig. 386, the points *a*, *a*, *a*, the places where it is cut into grafts, and the dotted lines show how the cuts are made.

Fig. 386.

Fig. 387 shows a portion of the shoot the natural size; 1, the first cut nearly directly across—2, the second or sloping cut, and 3, the slit for the tongue—and the whole finished and separate in fig. 388.

Fig. 387.

Fig. 388.

Three strokes of the knife are thus required to cut and prepare each graft, and a rapid and skillful operator has done one hundred and twelve in the manner described, in five minutes. Each shoot is thus cut up while yet held in the left hand, and the grafts as fast as they are severed, drop into the cavity of the apron already described. The counting is done during the process of cutting, and at no other time.

The second operation is setting these grafts into the roots. Each root is held in the left hand precisely as the scion has been—(fig. 389,) the

Fig. 389.

Fig. 390.

three cuts are given it (shown by the dotted lines in fig. 390,) to prepare it for the graft (as shown in fig. 391.) The grafts having been placed directly under the operator's fingers, and in the right position, each one is successively taken and firmly fitted to the prepared root, as shown in fig. 392, and as soon as this is done, another cut of the knife three inches lower down the root, severs it, and the root-graft is finished, and drops off obliquely on the table. Another sloping cut on the same root, and a slit for the tongue, are quickly made, and another graft picked up and inserted, the root being held all the while in the left hand,

Fig. 391.

Fig. 392.

until worked up. The great point is to perform much with little handling. A single root will sometimes make but one graft, but more commonly two or three, and sometimes more. Each portion of root should be about three inches long, and the graft about five inches.

Root-grafting may be performed at any time during winter, and those who have much of it to do, often continue the process the winter through. The roots when taken up in autumn, should be well washed, the tops cut off, and the roots packed in boxes with alternate layers of damp moss. Thrifty one-year roots are better and more easily worked than two-year roots. Side roots, or branches, should never be used. The scions should be kept in the same way. This is better than packing them in sand, which imparts a grit to them and dulls the knife. Different modes are adopted for packing away the grafts. The best is to place them flat in boxes, in alternate layers with sand, like miniature cord-wood, keeping the outer or graft-ends very even, and carrying up each layer separately and one at a time, so that one may be taken out for setting out without interfering with the next succeeding pile. The sand should be slightly moist and not wet. The varieties should be distinctly marked on strips of board separating each kind, where there is more than one in a box, and in addition to this, a card should be nailed on the outside, naming the kinds, at the point of separation between them. A record should also be made as they are deposited, of the sorts, their order, and the number of each. Boxes two feet long, a foot wide, and six inches deep, are a convenient size, and will hold from one to two thousand each. If furnished with bow handles, they are easily carried at once to the field for setting out. Boxes holding 20,000 or more, keep the grafts equally well, but require additional labor in unpacking when set.

They should be set out in spring as soon as the soil is sufficiently dry, and there is no further danger of its freezing severely. Special pains should be taken to pack the earth well about them, as they are dibbled in. The tips of the grafts should project about half an inch above the surface. The proper depth of setting is controlled somewhat by circumstances; if deep, the soil may be too cool to start them well; if the soil should not be deep enough, the dry season of the summer may destroy them. The old practice of setting them upright in boxes, to start into leaf before planting, is now discarded.

STRAWBERRY—Improved implement.—The greatest labor in tending the strawberry, is in keeping the runners cut or broken off, as they have to be severed a number of times during the season.

The implement shown (fig. 393) is designed to aid the strawberry culturist in this part of his work. It is made as follows: A handle (an old hoe or rake handle will answer,) with slit sawed in as

Fig. 393.

shown. B, circular steel cutting blade five inches in diameter, with sharpened edge, and one-quarter inch circular hole in centre. Arrange it within the end of the handle.

OPERATION.—Select a dry time when the ground is hard, and the runners will soon wither when severed from the parent stock. Run the blade half round the hill, with a slight pressure; enough only to cut the runners—two strokes should always clear a hill from runners. A rapid workman can clear 18,000 hills per day, which is 10,000 more than could be done in the old way—pinching them off—and will be found far easier to the operator, for the simple reason that you sever with two strokes all the runners on a hill; which by hand would require as many movements as there are runners, besides always being in a bent position. With this implement it is the reverse. A small bolt should be used for the axle, and by tightening it the blade becomes stationary, and can be used to remove the plants, and for various other garden operations.

STRAWBERRIES—TRANSPLANTING.—The best time to transplant strawberries is early in the spring; if we at that time set out the plants with care they are sure to grow. Transplanted immediately after bearing, and while the plants are somewhat exhausted, they will do well, and a good crop will result the next season, but they will require more care and labor than by spring transplanting. Prepare the ground by first enriching, and making it clean and mellow, and manure well, the amount depending on conditions of the soil. The plants should be selected from the youngest well-rooted runners of the previous year's stock. They should not be pulled out but carefully lifted out with a spade, and the earth shaken off. Dip the roots in mud, thick enough to leave a coating on them at least one-third of an inch in thickness. Then transplant, spreading out the fibres as much as may be convenient, taking particular care not to cover the crown. Mulching is then to be applied about an inch, or an inch and a half, of fine, partly decayed stable manure. This will prevent the surface from drying and becoming hard and crusted. In extreme dry weather water will be necessary.

Fig. 394. Strawberry Bunch.

RASPBERRIES AND BLACKBERRIES—TRANSPLANTING.—For the past two years, says the *Horticulturist*, we have annually planted out Rasp-

berry and Blackberry plants in July. We prepare our ground, and then go to the rows from which to remove the plants, having a tub or pail with a little muddy water in it, dig our plants, they being the half, grown ones of this year, pinch off the ends about two inches, set the roots into our pail of muddy water, and from that to their permanent position. We do not often lose a plant, and the next season we get a fair crop of fruit.

TRANSPLANTING—DIRECTIONS FOR.—1. Have a good, deep, dry soil—well underdrained, if wet. Bad fruit is often caused by hidden water standing below the surface.

2. If not very fertile it must be enriched by manure, which is best done a year or two before planting, as fresh, unmixed manure should never touch the newly set roots. Or strips of land eight feet wide for each row may be deeply plowed with the dead furrow in the middle (to promote drainage,) half a load or less of old manure or compost, placed for each tree, and thoroughly harrowed into the soil before setting.

3. If the ground has been well and deeply mellowed and enriched, the holes need be only large enough to receive the roots without bending; otherwise they should be five or six feet across, and a foot deep. On heavy land inverted sods are good in the bottom. Large holes, filled with rich earth or old compost will cause young trees to grow rapidly. Never place manure near the roots.

4. Pare off with a knife all bruised parts of the roots, to prevent decay. Place the tree no deeper than it stood before—less deep is better than more. Fill the fine earth carefully among the roots, spreading them all out with the fingers. No cavities should ever be left among or beneath the roots, and the earth may be well settled among them by pouring in water when the hole is part filled. All except small trees need staking to protect from the wind.

5. Autumn and spring are both good seasons for transplanting—except that tender trees, as peach and apricot, do best in spring, unless on a dry bottom. The autumn is the best season to procure trees from distant nurseries, even for spring planting. They may be safely wintered by burying the roots deeply in the earth in a dry, sheltered situation. Trees should be always shortened or cut in at the head when set out.

6. *Good, clean cultivation is of the utmost importance.* Neither corn, potatoes, nor fruit trees, can flourish surrounded by weeds and grass sod.

7. Water usually injures young trees by baking the earth. If necessary, lay the roots bare, pour on the water, and replace the earth. A rich soil, *kept mellow*, will not need water. Young cherry trees often die about midsummer, unless *mulched*, or with the earth about them covered several inches with old straw, or other litter. Trees dried by long carriage may be restored by immersion for a day or two in water.

TREES—Luck with.—We have noticed that certain men always have much finer peaches, and pears, and plums, than most of their neighbors, and are called lucky. Their luck consisted, in the first place, in doing everything well—taking what their neighbors called foolish pains—leaving nothing unfinished; in the second place, in taking good care of what they had; that is, giving their trees wide, deep, and mellow cultivation, applying manure where necessary, and especially the liquid manure from the chamber and wash tub. Great pains taken, whether with fruit trees or with children, scarcely ever fail to produce good results.

TREES—Tin labels for.—After many years' trial, we find nothing so cheap, simple, convenient and durable as strips of sheet tin for permanent labels on bearing fruit trees. They may be seven or eight inches long, an inch or so wide at the largest end, and tapering nearly to a point at the other. Neither the breadth nor the length requires accuracy. They are cut out of scrap tin, and may be made at the rate of a dollar per one thousand, or at a less cost. To write the name, lay the label on a table or board, and make the letters with the point of an awl or of a file ground to a sharp point, pressing firmly while writing. Each label is placed on the side limb of the tree, by bending the smaller end once or once and a half around it. The work is then done—in less time than the reader has occupied in reading these directions. Nothing further is necessary for many years. The point used for writing the letters scrapes away the tin coating, and admits the moisture of rain to the iron, rusting it and rendering the letters conspicious. As the limb increases in size, the tin yields to the pressure, and never cuts the bark, and is at the same time stiff enough to hold on and prevent the label being moved by the wind, which so often defaces and wears out other labels. Out of some hundreds made and put on trees about eight years ago, all are now distinctly legible and in their places, and most of them appear likely to last at least eight or ten years more. The cut (fig. 395) is an accurate representation of one of these old labels.

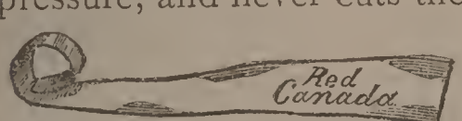


Fig. 395. Label for Trees.

TREES—Old, renovating.—Trees will, like everything else, get old, and we know of no better way to impart vigor to them than by manuring. The following manner of doing it we think far superior than the old practice of digging a circular trench around them and filling with manure. Dig narrow, radiating trenches from within a few feet of the trunk, directly from it—this will prevent cutting many of the roots. The annexed diagram (fig. 396,) will show the position of these trenches. These may then be filled with a *compost*, made

Fig. 396.

of turf, stable manure, ashes, and perhaps a little bone manure—the turf to be the chief constituent, say one-half or two-thirds—and the ashes say one-thirtieth. The bone manure is not essential, as its constituent parts are in common manure in small quantities. If this is done in autumn, the roots will be prepared to penetrate it early in spring, and if the tree is not past recovery, it may make a new push. The roots probably extend as far each way as the height of the tree, and the trenches should extend about as far. They need not be cut very near the tree, as the roots are all large there, and would be more likely to be injured, and would be little benefited. The trenches should be only the width of a spade, and may be two to four feet apart.

TREES—Straightening up.—If newly set trees of moderate size have been well dug up, with plenty of roots, and the roots well spread on every side, they will maintain a stiff, upright position, and need no additional staking or stiffening. But they have not always received such careful attention; and in this case they may need straightening up. Nothing can be much worse for a tree than the bending about in the earth by strong winds. They will sometimes stand well till the leaves come out, after which the winds have more purchase on them, and staking may be required.

MULCHING—Winter.—At the commencing of winter, those who have young trees liable to be injured by cold, and which need high culture, will find an especial advantage in applying a winter mulching of short manure. This treatment is eminently useful for dwarf pears. Protecting well the part below ground, is of use to the exposed portions above—in the same way that a man's feet and ears have been found to keep warmer on a cold day, when his body is well clothed.

The best time in the year to manure trees is late in autumn. If applied earlier, it prevents proper cultivation; and if in spring, its protecting influence is lost, and the liquid portions do not become so well diffused through the soil by the time that growth commences. The manure should be short (not necessarily old or rotted,) to prevent attracting mice; or if short manure cannot be had, a small cone of fresh earth should be raised around each tree, eight or ten inches high, which will effectually exclude the mice. In the spring, the manure is spaded in, if in a garden, or worked under by means of a gang-plow, if in an orchard kept clean by horse power.

WINTER PROTECTION.—It is best not to cover raspberries, grapevines, etc., till winter is close at hand, as they will ripen and harden better if exposed till that period. Grapevines are often sufficiently protected, if simply lying flat on the ground—or at most, with an inch or two of the soil. The same remark will apply to the raspberry and blackberry. Caution is needed in the use of the straw around fruit trees, as it may encour-

age depredations of mice. If covering the stems, it should not be closely tied about them, as circulation of some air is the best. Evergreen boughs placed about any tender trees, afford the best and safest protection. The thicker the coat they form, the more complete the covering will be.

IMPLEMENTS OF HORTICULTURE.—FLORAL RAKE (fig. 397.)—This convenient little tool consists of a small six-tooth rake on one side and a hoe blade on the other. The handle is about fifteen inches in length, and it may be used with one hand while sitting on a stool at the flower bed. It is a very convenient tool for the use of ladies.

Fig. 397.—Floral Rake.

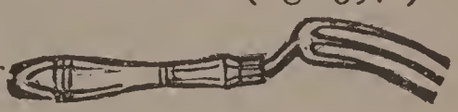
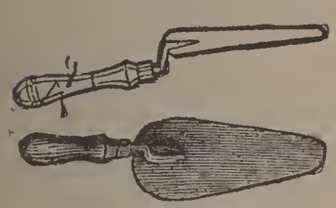


Fig. 398.—Garden Fork.

GARDEN FORK (fig. 398.)—This is made of steel, and is used for loosening the earth in flower beds, and about the roots of plants. When the soil is sufficiently moist or adhesive, it answers a good purpose for transplanting annuals and small plants.

TRANSPLANTING TROWELS (figs. 399 and 400.)—These are made of various forms and sizes, for transplanting, weeding, loosening soil on a small scale, etc. The concave ones are most commonly used for transplanting, cutting out blocks of soil in a circular form, but the flat ones are best for working the soil.



Figs. 399 and 400. Transplanting trowels.

Fig. 401.–Vine Scissors.

VINE SCISSORS (fig. 401.)—A neat and convenient instrument for thinning out the berries from bunches of grapes which have grown too thick, for removing unnecessary shoots, leaves, etc., and for gathering the fruit.

FLOWER GATHERER (fig. 402.)—This combines scissors with small pincers, and are not only useful in clipping the stalks of herbaceous flowers, but more especially so for roses and other plants furnished with spines and prickles. The scissors cut the stalk, and the pincers hold it until secured.

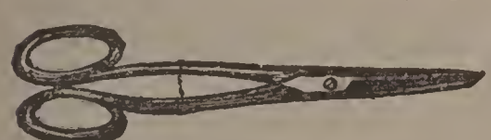


Fig. 402.—Flower Gatherer.

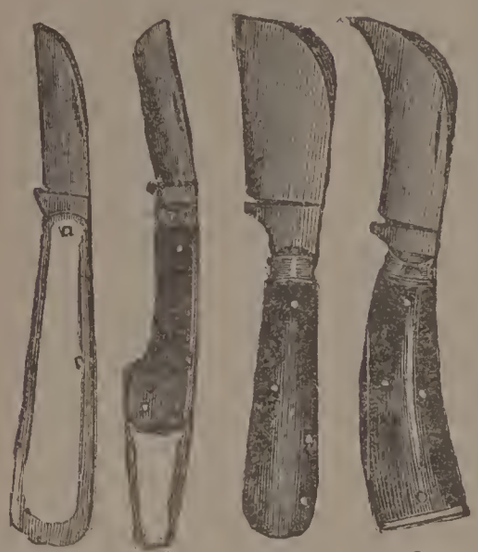
SHEARS FOR EDGING (fig. 403.)—These are particularly applicable to trimming the sides of box and other edging to walks and flower-beds—the operator standing upright while using them, and resting the shears on the wheel, while he thrusts them onward in shearing.

Fig. 403. Shears for Edging.

Fig. 404. Grafting Chisel.

GRAFTING CHISEL (fig. 404.)—This is one of the best forms of the grafting chisel, combining the knife and wedge. The wide cutting part is used

for making the cleft in the stock—the pointed ends for opening the cleft to receive the scions.



Figs. 405. 406. 407. 408.

PRUNING AND BUDDING KNIVES.—Fig. 405 is a very convenient knife for light pruning, sloping grafts, etc. Fig. 406 is the best form of the budding knife; the sharp edge of the blade being convex, allows the operator to make the upright slit in the bark, in places where it would be hard to reach it with a common pointed knife, and without scraping or injuring the young wood. Figs. 407 and 408 are strong knives for pruning, the former for ordinary work, and the latter for removing small limbs, stubbing down stocks, etc.

TREE SCRAPER (fig. 409.)—This is used for removing the rough and shaggy bark, moss, etc., from old fruit trees. It consists of a triangular plate of steel, attached to a handle at the centre. The sides of the triangle are about four inches, and the handle may be from one to several feet in length.

Fig. 409. Tree Scraper.

GARDEN SYRINGE (fig. 410.)—This is made of various sizes, of different materials, and with different caps or orifices. The cheapest is made of thick sheet tin, and the best and most durable of brass. For throwing a single stream, the jet represented in the figure is attached; for washing dusty foliage with a soft shower, a rose with many fine holes is screwed on. The syringe is used for washing, watering, destroying insects, etc.

Fig. 410. Garden Syringe.

GARDEN ENGINE (fig. 411.)—This may be used for all the purposes of a syringe, in washing and watering plants, and also for washing windows, carriages, and protecting buildings against fire. It will hold about a barrel of water, and is easily moved by its handles on the cast iron wheels. It will throw water 40 feet high.

Fig. 411. Garden Engine.

Fig. 412.

WHEEL BARROWS are of two kinds; fig. 412, is the simpler or canal barrow, used for wheeling earth, stones, and manure, and is emptied by tipping it on its side; and fig. 413, is the larger or box bar-

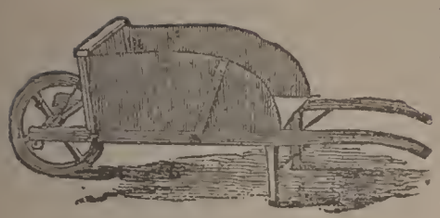


Fig. 413.

row, the side boards of which may be removed for unloading, or for receiving larger articles than would enter the box.

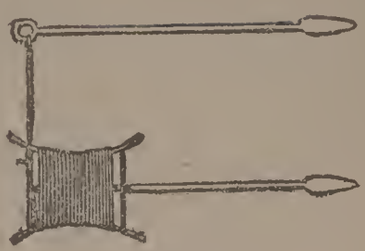


Fig. 414

GARDEN REEL. — Fig. 414 represents the reel for the garden line, and stake for stretching the same, all made of iron. The stakes should be at least a foot long. The line should be a strong, well twisted hemp cord, about one-fifth of an inch in diameter, which, when not in use, is quickly wound up on the reel.

SEED SOWER (fig. 415.)—This is designed for sowing the seeds of various garden crops, opening the soil, dropping the seed, covering and rolling, all at one operation. It lessens the labor of planting the early crops of vegetables.

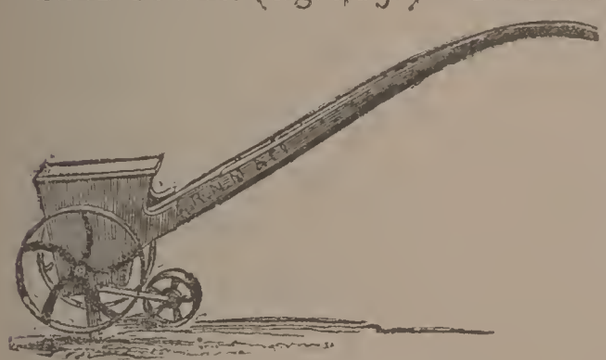


Fig. 415. Seed Sower

Fig. 416.

GARDEN SEAT.—Fig. 416 represents the end view of a garden seat so constructed that it may be instantly reversed when not in use, and protected from rain, dew, leaves, bird-slime, etc., and whenever needed is always clean and dry. The shaded part is the board legs or support, on which rests another board (represented as lying flat, in the cut,) forming about one-half of the bottom of the seat. The rest of the bottom, and the back, *b*, is shown as turned up or inverted, forming a roof to the flat part; but when wanted for use, it is turned back by means of a hinge at *a*, and becomes a perfect seat with a back.

RAKE FOR SEED DRILLS.—J. Harris, of the *Genesee Farmer*, uses a convenient rake for forming rapidly and with perfect straightness, the drills for onions and other small garden seeds. The head of the rake is about seven feet long, and the teeth about one foot apart (fig. 417.) A length of four or five feet would be less cumbersome, but operates more slowly. The first set of drills are made perfectly straight by running to a stretched line; and by running the first tooth in the last mark afterwards, the whole are kept equally so. To drop the seed expeditiously into these drills, we have found the following mode an excellent one: Provide a small tin cup like an inverted tin canister, with the bottom removed, as shown in fig. 418. Several cups should be provided, fitting tightly on the lower end or funnel, with perforations of different sizes

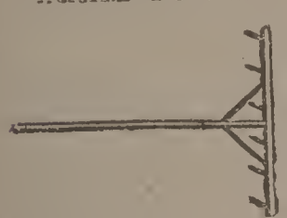


Fig. 417. Rake for Seed Drills.

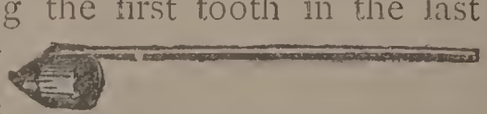


Fig. 418.

to suit different kinds of seeds; nail this cup to the lower end of a stick, about as long as a common walking cane, place the seed within the cup, and pass along the drills, shaking it over them. It will prevent stooping, and enables the operator to walk fast.

APPLE FRITTERS.—Pare and core some fine large pippins, and cut them into round slices. Soak them in sugar, moistened with water, and nutmeg for two or three hours. Make a batter of four eggs, a tablespoonful of rose-water, and one of milk; thicken with enough flour, stirred in by degrees, to make a batter; mix it two or three hours before it is wanted, that it may be light. Heat some butter in a frying-pan; dip each slice of apple separately in the batter, and fry them brown; sift powdered sugar and grate nutmeg over them.

ARTICHOKES.—Soak them in cold water, and wash them well; put them into plenty of boiling water, with a handful of salt, and let them boil gently for one and a half or two hours; trim them and drain on a sieve; send up melted butter with them, with some put into small cups, one for each guest.

ARTICHOKES—Boiled.—Twist off the stalks and wash them in cold water. When the water boils put them in with the tops down. They will be done in one and a half hours. Serve with melted butter.

BACON AND CABBAGE.—Boil some fine streaked parts of bacon with a little stock, and the ends of eight or ten sausages; boil in the same stock some white cabbages for two hours, adding salt and spice, and serve very hot; place your sausages and cabbage around your dish, and the bacon in the middle.

BEEF—To roast.—The noble sirloin of about fifteen pounds (if much thicker the outside will be done too much before the inside is enough,) will require to be before the fire about three and one half or four hours. Take care to spit it evenly, that it may not be heavier on one side than the other; put a little clean dripping into the dripping-pan; (tie a sheet of paper over it to preserve the fat;) baste it well as soon as it is put down, and every quarter of an hour all the time it is roasting, till the last half hour; then take off the paper and make some gravy for it; stir the fire and make it clear; to brown and froth it, sprinkle a little salt over it, baste it with butter, and dredge it with flour; let it go a few minutes longer, till the froth rises; take it up, put it on the dish, etc.

BEEF—To bake rump of.—Cut out the bone and break it, and beat the flesh with a rolling pin; season with pepper, salt, and cloves, and lard the meat across. Put the meat into an earthen pan, with the broken bones,

some butter, bay leaves, whole butter, one or two shalots, and sweet herbs; cover it close, and place it in the oven; it will require six hours to bake. Skim off the fat, dish the meat, and serve with dried sippets and its own liquor.

BEEF—To ROAST.—The primest parts are roasted, except the round which should be boiled; the ribs make the finest roasting-joint.

Where a small quantity is required, it is better for the bones to be cut out, and the meat rolled; this should be done by the butcher, who will not only cut cleaner, but skewer the parts into a fillet with more firmness and neatness than the cook, who is not expected to be as expert with the knife and skewer as the butcher. The tops of the ribs are frequently cut off into pieces of 3 or 4 pounds; this piece, though occasionally roasted, should be salted; it then approaches in flavor to the brisket.

In roasting the ribs, or any piece of beef, the precautions mentioned respecting placing it too near the fire, must be observed; and where there is much fat, and it is desired to preserve it from being cooked before the lean, it may be covered with clean, white paper skewered over it; when it is nearly done, the paper should be removed, a little flour dredged over it, and a rich, frothy appearance will be obtained. The joint should be served with potatoes and other vegetables; the dish should be garnished around the edge with horse-radish scraped into thin curls. This recipe will suffice for all the other roasting parts of beef.

BEEF—ROAST STEW.—Cut cold roast beef into small bits, pour over the gravy left from dinner. Chop an onion, or better still, a small piece of garlic, add to the meat with pepper, salt, and a little Worcestershire sauce. If not enough gravy, add a little hot water, put in a bit of butter, and thicken with flour.

BEEF—STEW.—Take 2 or 3 pounds of the rump of beef, cut away all the fat and skin, and cut it into pieces two or three inches square, put it into a stew pan, and pour over it a quart of broth; then let it boil, and sprinkle in a little salt and pepper to taste; when it has boiled very gently, or simmered two hours, shred finely a large lemon, adding it to the gravy, and in twenty minutes pour in a flavoring composed of two tablespoonfuls of Harvey's sauce, the juice of the lemon (the rind of which has been sliced into the gravy,) a spoonful of flour, and a little catsup; add at pleasure, two glasses of Madeira, or one of sherry or port, a quarter of an hour after the flavoring, and serve.

BEEF—STEAKS BROILED.—Be particular that the fire is clear; it is of no use to attempt to broil a steak over a dull, smoky, or flaring fire; see that the gridiron is clean and the bars rubbed with suet preparatory to laying on the steaks; when the meat is browned, turn it; do not be afraid of doing

this often, as this is the best plan to preserve the gravy. When they are done, rub them over with a piece of fresh butter, pepper and salt them, sprinkle the shalot, or onion, cut very small, and send them to table with oyster sauce, a dish of nicely cooked greens, and well-boiled potatoes. They are frequently and pleasantly garnished with scraped horse-radish.

BEEF TEA.—Beef tea is best made by cutting up tender, juicy beef in bits about one inch square, and put it in a strong bottle, cork it tightly, and set it in a kettle of cold water. Boil it about two hours. The fluid thus obtained will be the pure nutriment of the meat, and its tonic effects are powerful. Physicians have considered it better than alcoholic stimulants in cases of extreme exhaustion, where there is a feverish tendency in the patient.

BEEFSTEAK—To cook.—Don't fry your beefsteak, but if you like gravy with it, broil it, after pounding, in an empty, hot spider; turn it over many times, and when sufficiently done, take it up on a platter. All the juice of the meat will be left in the spider. Add a little hot water, and thicken with flour and water smoothed together, for gravy. Steak is usually spoiled in one of three ways: 1. By not pounding it enough. 2. By not turning it often while cooking. 3. By crowding too much into the spider at once, so that it cooks unevenly.

BEANS—To cook.—The usual way people cook beans is to parboil them; put them in a kettle or pan, set them in the oven to bake, with a piece of fat pork in them. The grease oozes out into the beans, causing a most unwholesome and indigestible mass, destroying all the good flavor of the beans. Now, the method for cooking them (which all who have tried it pronounce excellent) is as follows: Parboil as usual, putting in salt to suit the taste. Then put them in a pan and set in the oven to bake, putting in a piece of good, sweet butter—the size of a butternut will answer. Bake until tender and nicely browned over on top. Beans are very nutritious, and cooked in this way are palatable, digestible, and can be eaten by any one. If you want the pork, cook it in a dish by itself.

BUTTER—To clarify.—Take butter, melt it in a warm bath, then let it settle, pour off the clear, and cool as quickly as possible. Butter prepared in this way will keep a long time good.

CABBAGE—To stew.—Parboil in milk and water, and drain it; then shred it, put it into a stew-pan, with a small piece of butter, a small teacupful of cream and seasoning, and stew till tender.

CABBAGE SALAD.—This is a wholesome dish, as raw cabbage is much sooner digested than when cooked; a dressing of vinegar or sweet cream; shred it finely as for slaw.

CABBAGE—Cold slaw.—Take fresh cabbage—white is preferable—

wash, drain it, and cut off the stalks. Shave the head into very fine shreds with a cabbage cutter or sharp knife. Place it in a deep china or earthen dish, and prepare for it the following dressing: To one-half a pint of cider vinegar add one quarter of a pound of butter, cut in five or six bits and rolled in flour; add a small saltspoon of salt. Stir well together, and boil in a saucepan. Have ready the yolks of four eggs well beaten. When the mixture comes to a boil, remove it from the fire, and stir in the eggs. Pour this boiling hot over the cabbage, stir it thoroughly through with a spoon, and set it in ice or snow, or some cool place, to get thoroughly cold before being served at the table.

CAULIFLOWER—Cooking the.—Put a good sized cauliflower in just enough *boiling* water to cover it, with a large teaspoonful of coarse salt, and a piece of carbonate of soda the size of a moderate green pea, and boil for twenty-five minutes; then dish and drain out all the water, and put two ounces of butter on top of the cauliflower, and cover close.

CHICKENS—Cutlets of.—Remove the skin of two or three chickens. Bone all the joints except the wings, unless the fowl is very fleshy, and then remove them also, removing likewise breast-bones; flatten the flesh, and spread over them a seasoning of salt, cayenne, grated nutmeg, and mace, the salt being in the greatest proportion. Coat them with beaten egg and bread-crumbs, and fry them a nice brown. Have ready some good brown gravy, seasoned and flavored with lemon pickle. Lay the cutlets in the centre of the dish, and pour the gravy over them.

CHICKENS—To fry.—Cut up the chickens and lay them in cold water to extract the blood. Wipe them dry, and season with pepper and salt, and dredge them with flour. Fry in lard to a rich brown; take them out and keep them near the fire; skim the gravy carefully in which the chickens have been fried, mix with it $\frac{1}{2}$ pint of cream; season with mace, pepper, salt and parsley.

CHICKEN BROTH.—Cut a chicken into small pieces, and remove the skin and any fat that is visible; boil it for 20 minutes in about a quart of water, with a blade of mace, a slice of onion, and 10 corns of white pepper. Simmer slowly till the flavor is good. Beat a $\frac{1}{4}$ of an ounce of sweet almonds with a little water; add it to the broth, strain it, and when cold take off the fat.

CHICKEN POT-PIE.—Clean, singe, and joint a pair of chickens. Pare and slice 8 white potatoes; wash the slices, and put with the pieces of chicken into a stew-pan lined with pie-crust; season with salt and pepper, dredge with flour, and cover with water. Cover with paste, making a hole in the centre; cover the kettle, and either hang it over the fire or set it in the oven. If in the oven, turn occasionally to brown evenly. Two hours' cook-

ing is sufficient. When done cut the upper crust into moderately small pieces and serve.

CODFISH BALLS.—Pick up as fine as possible a teacup of nice white codfish. Freshen all night, or, if wanted for any other meal than breakfast, from the morning. Scald it once and drain off the water. Chop and work it until entirely fine. Put it in a basin with water, a bit of butter the size of an egg, and 2 eggs. Beat it thoroughly, and heat it until it thickens without boiling. It should, when all is mixed, be about 1 quart. Have some potatoes ready prepared and nicely mashed. Work the fish and potatoes thoroughly together as above, make it in flat cakes, and brown both sides.

COFFEE—To MAKE GOOD.—In order to make good coffee, a practical cook says that the first thing necessary is to never allow an ounce of ground coffee to come into the house. If no one understands the art of roasting coffee, then buy it ready roasted, and try and find a dealer who has not soaked all the essential juices from the coffee before putting it into his oven. If the roasted berry is about twice as large as when in its green state, depend upon it you have been defrauded. Get an earthen pot—you cannot make good coffee or tea in a tin vessel—and put the ground coffee in a clean white flannel bag, and be sure to put enough in, and drop the bag into the pot. Pour on boiling water and let it steep; do not boil it. The coffee will steep in twenty minutes. Never break an egg into coffee, and never fill up with water the second time. Pour on in the beginning the amount of water needed. An ordinary teacupful of ground coffee is sufficient for three persons. Use Java, Mocha, or Java and Rio mixed. Follow this recipe, and you will never complain of poor coffee.

CRANBERRY JELLY.—Put 1 quart of cranberries, which have been carefully picked over, to boil in 1 pint of cold water; have ready in a bowl 1 pint pure white sugar; when the cranberries are perfectly soft, mash them while hot through a colander into the bowl which contains the sugar, and stir until the sugar is dissolved; then pour into moulds and set in a cool place for at least 24 hours. If the cranberries are good and no more water is used than the receipt calls for, this way of cooking them makes beautiful moulds for the table.

CRANBERRY SAUCE.—To stew cranberries, a quart of berries, a pint of brown sugar, and a pint of water; place all in a porcelain kettle, cover closely, and allow them to cook eight minutes after coming to a boil without stirring: remove from the fire, and empty into an earthen dish to cool.

CUCUMBER SALAD.—To 100 cucumbers add a quarter of a peck of small onions. Peel both and cut them into thin slices; cover with salt and stand in the sun for six hours; rinse clean, and stand in clear, cold water

for one hour. For the dressing take a box of the best mustard, put into it a little salt, pour in sufficient olive oil to stir it easily, and add vinegar and oil alternately till thin enough to pour smoothly. Put the cucumbers in jars, cover with the dressing, and cover closely. Seal the jars.

DUMPLING—Baked apple.—Make a rich paste. Pare and core the apples, fill the cavities with sugar, and flavor with essence of lemon. Cover each apple with thinly-rolled paste, and bake in tin pan. Serve hot, with rich sauce.

Apple.—Pare a few good-sized baking apples, and roll out some paste, divide it into as many pieces as you have apples, cut two rounds from each, and put an apple under each piece, and put the other over, join the edges, tie them in cloths, and boil them.

English. — Make a very light dough, as for biscuit, with baking powder, in the proportion of a heaping tea-spoonful of the powder to a pint of flour, mixing with milk or water, and with salt added; have ready a large stew-pan with boiling water, make the dough into balls the size of a medium dumpling, throw them in, and boil them for twenty minutes without taking off the lid. To ascertain when they are done enough, stick a fork into one, and if it comes out clear it is done. Before serving, tear them apart on top with two forks, as they become heavy by their own steam. Serve with butter and sugar.

DUMPLINGS.—Pare and scoop out the core of six large baking apples; put part of a clove and a little grated lemon peel inside of each and inclose them in bits of puff paste; boil them in nets for the purpose, or bits of linen, for an hour. Before serving cut off a small bit from the top of each and put in a tea-spoonful of sugar and a bit of fresh butter; replace the bit of paste and strew over them pounded loaf sugar.

DUCKS—To roast.—Ducks should be well plucked without tearing the skin, all the plugs being removed. Some cooks go so far as to skin the duck, holding it a minute by the feet in scalding water, that the skin may peel easier; clean the insides thoroughly with a little warm water, and stuff with the same stuffing as for geese, using a little more bread for the sake of mildness; roast them before a brisk fire, but not too close, and baste frequently; they will take from half an hour to an hour, according to age and size; when the breast plumps, they will be just done; serve them with rich brown gravy.

EGG—Mulled.—Beat the yolk of a fresh egg in a tea or coffee cup, put in a little milk or cream and sugar, and then pour into it as much tea or coffee as will fill the cup, taking care to stir it well at the same time to prevent the egg from curdling. This makes a good breakfast for an invalid. It is light and nourishing without being heating.

EGG OMELETTE.—Unless a great omelette is to be made, a small frying pan should be used, so as to insure thickness. 5 or 6 eggs will make a good sized omelette. Beat them well with a fork or egg beater; add a salt spoon of salt; put 2 ounces of butter in the frying pan; when melted pour in the omelette (beaten eggs,) stir with a spoon until it begins to set, then turn it up all around the edges, and when it is of a nice brown it is done. To take it out, turn a hot plate over the omelette, and turn the pan upside down. Double it over like a turn-over, and serve hot. If not sufficiently done on the top, brown with a salamander or a heated shovel. To have the omelette particularly fine, about as many whites as yolks should be used.

EGG OMELETTE. — Beat separately the yolks and whites of four fresh eggs; to the yolks add as much powdered white sugar as will sweeten it, and a small dessert-spoonful of corn flour, very smoothly blended in a spoonful of cream or good milk. Beat the whites to a stiff froth, add the flour to the yolks, and gently stir in the whites, taking care to break the froth as little as possible; pour the whole into a frying-pan from which the butter has been drained; two or three minutes over a clear fire is enough to cook the under side; hold the pan to the fire till the upper side looks firm; spread raspberry or strawberry jam over one-half, turn the other side over it, and serve immediately.

A dish resembling omelette can be made by breaking up eggs and frying them in hot lard. Salt and pepper, and when done, invert the spider, and turn out its contents on a plate. Send to the table hot.

EGGS—To POACH.—Put in a pinch of salt into some boiling water, also a tea-spoonful of vinegar. Break the eggs one at a time into a saucer, and slip into the water, which must be boiling, and enough in the spider to keep the eggs from touching bottom.

EGGS—To POACH.—The beauty of a poached egg, like a fried one, consists in having the white just sufficiently hardened to form a transparent veil for the yolk. Pour from a tea-kettle as much boiling water as you shall need, through a clean cloth into a stew-pan; it should be half filled. Break the eggs separately into a cup or saucer, and when the water boils remove the pan from the heat, and gently slip the eggs in; when the white is set replace the pan over the fire, (which should be moderate,) and as soon as the water boils the eggs are done; remove them with a slice and trim off the ragged edges. If served on toast, cut the bread in pieces a little larger than the egg, and about $\frac{1}{4}$ of an inch thick: brown only on one side, and just enough to give yellow color; too much browning yields a bitter flavor. The toast may be moistened with a little hot water. Some sprinkle on it a few drops of vinegar or essence of anchovy sauce.

EGGS—Scrambled.—Have a little lard heated in a spider, and break in eggs, one or two for each person; stir briskly, salt, and take up when they harden. A little chopped parsley and cold ham added to the eggs, make an agreeable dish.

FISH—To choose.—All fish, of whatever species, may be known to be perfectly fresh by their being rigid and having bright eyes.

FISH—To boil.—The proper sign that fish is done by boiling is that the flesh separates readily from the bone, and has lost all appearance of redness and transparency. It is important that this should be kept in view, as fish underdone is unwholesome. The opposite extreme, however, must also be carefully guarded against.

FISH SAUCE.—Take ½ a pint of milk and cream together, two eggs well beaten, salt, a little pepper, and part of the juice of a lemon. Put it over the fire and stir it constantly until it begins to thicken.

FOWLS—Choice of.—If a cock, choose with short spurs, observing that they have not been pared or cut; if a hen, her comb and legs must be smooth; when old they are rough, and on the breast long hairs are found instead of feathers; smell them whether they are fresh, and feel whether the breast-bone is well-covered; if not, they have probably died from disease.

FOWL—To broil.—Slit the fowl down the back, and score to the bone all the thicker parts, as the thighs and breast, in order to its being all equally done. Brush over the inside and the places scored with catsup and pepper, and broil over a clear fire. A sauce should be made of butter and flour melted brown, into which, when taken from the fire, should be put capers or button mushroons.

FOWL AND CHICKENS—To roast.—Put them down to a good fire, and baste them well with butter. A fowl will require nearly an hour to roast, and a chicken about one-quarter of an hour or twenty minutes. For the fowl let a gravy be made of the neck and gizzard, and when strained put in a spoonful of browning. Serve the chicken with parsley and butter.

FOWLS—How to cook old.—Prepare as for roasting; then boil three hours in a covered pot, with one quart of water, to which add two tablespoonfuls of vinegar; after which put into a pan in a hot oven for about one hour to brown. The liquor in the pot is to be prepared for gravy; should the water boil away too much more must be added. The result is, the meat is as tender as young chicken, and some think richer and better.

FOWL—Sauce for.—An excellent white sauce for fowls may be made of two ounces of butter, two small onions, one carrot, one-half a teacupful of flour, one pint of new milk, salt and pepper to taste. Cut up the onions and carrots very small, and put them into a stew-pan with the butter; sim-

mer them until the butter is nearly dried up; then stir in the flour and add the milk. Boil the whole gently till it thickens, strain it, season with salt and Cayenne, and serve.

FOWL—Stewed with onions.—Wash it clean, dry and truss it as for boiling; put a little pepper and salt into it, and rub it with butter; butter a saucepan; put the fowl in the pan with a pint of veal stock or water seasoned with pepper and salt. Turn it while stewing, and when quite tender add twelve small onions, split, Stew all together for half an hour. A young fowl will take one hour, an old one three hours to stew.

GEESE—To choose.—A young goose has a yellow bill; if red, it is a sign of age; if fresh, the feet will be pliable, but stale if stiff and dry.

GOOSE—Roast.—Presuming that the bird is carefully plucked, singed, washed, and dried, put into it a seasoning of onions, sage, pepper, and salt, fastening tightly the neck and rump. Put it at first at a distance from the fire; paper the breast-bone; baste well, and when the breast is rising take the paper off. Let good gravy be sent in the dish. Serve with potatoes, gravy, and apple sauce.

GOOSE—Boiled.—Having singed the goose, pour over it a quart of boiling milk; let it lie all night in the milk, after which take it out and dry it well; stuff it with sage and onions, cut small; sew up the openings, and hang it up for a day. Boil for one hour and serve with onion sauce.

GREEN PEAS—To stew.—Put into the stew-pan a quart of peas, a lettuce, and an onion sliced, butter, pepper, salt, but no more water than remains about the lettuce after washing. Stew two hours very gently. When to be served, beat up an egg and stir it into them, or a little flour and water.

HADDOCK—To fry.—Skin the fish, cover it with bread-crumb and egg, seasoned with salt and pepper, and fry with boiling lard or butter.

HOTCH-POTCH.—(A favorite Scotch soup.) Boil a good-sized neck or breast of lamb for half an hour; take out of the soup pot six of the best chops, and lay them aside; then boil the rest to a good stock. Wash and cut into small pieces four freshly pulled young turnips, four young carrots, twelve young onions, a good-sized lettuce, and a small bunch of parsley; boil all these in the stock one hour. Twenty minutes before the soup is required, cut up a fresh cauliflower and put it in together with a quart of green peas, a pint of young beans, and a little pepper and salt; heat the chops that have been laid aside, and pour the soup over them in the tureen. A sprig of mint is an improvement.

MUSHROOMS—Broiled.—Mushroom-flaps, pepper and salt to taste, butter, lemon-juice. Cleanse the mushrooms by wiping with a piece of flannel and a little salt; cut off a portion of the stalk, and peel the tops;

broil them over a clear fire, turning them once, and arrange them on a very hot dish. Put a small piece of butter on each mushroom, season with pepper and salt, and squeeze over them a few drops of lemon-juice. Place the dish before the fire, and when the butter is melted serve very hot and quickly. Moderate-sized flaps are better suited to this mode of cooking than buttons; the latter are better in stews.

MUSHROOMS—To stew.—Trim and rub clean with a bit of flannel dipped in salt half a pint of large button mushrooms; put into a stew-pan two ounces of butter; shake it over the fire till thoroughly melted; put in the mushrooms, a teaspoonful of salt, half as much pepper, and a blade of mace pounded; stew till the mushrooms are tender, then serve them on a very hot dish.

MUSHROOM CATSUP.—Gather mushrooms in dry weather; take the large, fully-developed flaps, and see that they are free from insects and earth. Add to each peck of mushrooms ½ a pound of salt; break them up into a large earthenware pan, strew the salt over them, and let them stand for 3 days, stirring and mashing them up each day, then strain out all the juice. To every quart of juice put ½ an ounce of whole black pepper, ½ an ounce of bruised ginger, ¼ of an ounce of allspice, ¼ of an ounce of cayenne, and the same quantity of pounded mace. Put all the spices with the juice into a large earthenware jar (standing in a pot of water,) and boil for 3 hours; or the catsup may be boiled in a preserving pan. Let the spices remain in it when bottled.

MUSTARD—Superior table.—Take of best flour of mustard 2 pounds; fresh parsley, ½ ounce; chervil, ¾ ounce; celery, ¾ ounce; tarragon, ¾ ounce; garlic, 1 clove; and 12 salt anchovies (all well chopped;) grind well together; add of salt 1 ounce, and sufficient grape juice or sugar to sweeten, with sufficient water to form the mass into a thinnish paste by trituration in a mortar. When put into pots, a red-hot poker is to be thrust into each, and a little vinegar afterwards poured upon the surface.

MUSTARD, French.—Salt, 1¼ pounds; scraped horse-radish, 1 pound; garlic, 2 cloves; boiling vinegar, 2 gallons; macerate in a covered vessel for 24 hours; strain, and add sufficient flour of mustard.

MUTTON—To roast a saddle of.—Take lean ham, truffles, green onions, parsley, thyme, and sweet herbs, all chopped small, with some spice, pepper and salt. Strew them over the mutton when the skin is taken off, put the skin over it neatly, and before roasting it tie over it white paper well buttered. When the meat is nearly done take off the paper, in order that the surface of the meat may be nicely browned.

MUTTON—Stewed leg of.—Put it into the stew-pan with either broth or water, 2 or 3 carrots, a turnip, an onion, and a few black pepper-corns.

After coming to a boil, simmer for 2¾ hours, take out the broth and vegetables, dredge the meat with flour, and put it again on the fire to brown, leaving off the cover. Pulp the vegetables through a sieve, and boil them up with the gravy, adding a tablespoonful of vinegar. Pour part of the sauce on the meat and send the rest to the table in a tureen.

MUTTON BROTH.—2 pounds of a neck of mutton, a large handful of chervil; put these into 2 quarts of water and boil down to 1 quart. All of the fat should be removed. A pint may be taken 2 or 3 times a day. It affords excellent nutriment to the weak.

ONIONS—BOILED.—Take the outside skin from white onions as uniform in size as possible, lay them in cold salt and water for 1 hour, and then boil them in milk and water until thoroughly tender; lay them in a deep dish and pour over them melted butter.

ONIONS—ROASTED.—These should be cooked in their skins; but before putting them into the oven brush off all grittiness. Place in a moderate oven, cooking gradually until nearly done; then quicken the oven and brown. Serve with plenty of fresh butter.

OYSTER STEW.—Stew the oysters in their own liquor, and season to the taste with a little salt and pepper, butter may be added. Stews are often improved, in the opinion of many, by the addition of milk or cream, and condiments in the way of mace, parsley or nutmeg. If thickening of the soup is desired, grated cracker is preferable to flour. The best cooks omit flour entirely. A piece of butter rolled in grated cracker may be added. Pour the oysters, when done, over a dish floored with crackers, or covered with layers of crispy toasted bread.

OYSTERS—TO FRY.—After they are taken from the shell, dry them on a clean cloth or napkin. Beat up the yolks of eggs with thick, sweet cream—one yolk to two tablespoons of cream. Rub together some grated bread crumbs or cracker, and a little salt and pepper. Have hot in a skillet three-quarters of a pound of melted butter. Dip each oyster in the beaten yolk and cream, and then roll it in the crumbs, coaxing them to adhere to it. Drop into the skillet, and fry until of a light brown color on both sides. They ought to be crisp and light. Never pour over them the melted grease that may remain.

OYSTERS—TO BAKE, ROAST OR BOIL.—But a few minutes are required for this. Wash the shells clean. To roast, lay the shells on a gridiron, over a bed of live coals. When the shells open they are done. Lift off the top, and serve in the under shell. To bake them, put in a pan in hot oven; otherwise follow the same directions as for roasting. To boil, put them in a pot of boiling water. Serve in the shell.

OYSTER SOUP.—To each dozen or dish of oysters put half a pint of

water; milk one gill; butter half an ounce; powdered crackers to thicken. Bring the oysters and water to a boil, then add the other ingredients previously mixed together, and boil from three to five minutes only.

OYSTER PATTIES.—Take of oysters sufficient for the patties you may chance to want, strain the liquor and return it to them; mix them with very fine bread crumbs until they are of proper thickness; add a little scalded cream, and season the whole with pepper, salt, and cayenne pepper; warm the whole in a saucepan till it begins to simmer; when cold, put it in the paste, and bake it in the shape of small mince pies, three inches in diameter. The beards and horny part should be cut off, and the oysters cut in two or three pieces.

OYSTER PIE.—Line a deep pie-plate with pie-crust; fill it with pieces of bread; cover with nice pastry and bake it in a quick oven till a little brown; have the oysters stewed and seasoned; just as the pastry is baked take off the upper crust, remove the bread, and put in the oysters; cover it and serve while hot.

OYSTERS—Scolloped.—Select the best oysters, and wash them in a little hot water; rub half a loaf of stale bread through the colander. Put a layer of oysters in a shallow baking-dish, and season them well with pepper and salt. Sprinkle over them a thin layer of bread-crumbs; only enough to cover them. Strew bits of butter all over the bread, put in another layer of oysters, and finish as before. Two layers take better than three, and shallow dishes are the best to use. Boil up the water the oysters were washed in, with the liquor left from them; skim it clean, and just as you put the dishes into the oven, strain it into the side of them, so as not to wet the bread. The oysters need a good deal of pepper and salt, because the bread absorbs it, but they must not be either too highly or too little seasoned. Bake for half an hour in a brisk oven.

PARTRIDGES—To roast.—Rightly to look well there should be a leasht (three birds) in the dish; pluck, singe, draw and truss them; roast them for about twenty minutes; baste them with butter, and when the gravy begins to run from them you may safely assume that the partridges are done; place in a dish, together with bread crumbs, fried nicely brown and arranged in small heaps. Gravy should be served in a tureen apart.

PARTRIDGES—To broil.—Cut them in half, dip them in butter previously melted, and cover them thickly with crumbs of bread. A quarter of an hour ought to be sufficient to cook them over a clear fire.

PARTRIDGE PIE.—Two braces of partridges are required to make a handsome pie. Truss them as for boiling; pound in a mortar the livers of the birds, a quarter of a pound of fat bacon, and some shred parsley; lay part of this forcemeat at the bottom of a raised crust; put in the partridges,

add the remainder of the forcemeat and a few mushrooms; put some slices of bacon fat on the top, cover with a lid of crust, and bake it for 2½ hours. Before serving the pie remove the lid, take out the bacon, and add sufficient rich gravy and orange juice. Partridge pie may also be made in a dish in the ordinary way.

PASTE—For fruit or meat pies.—This paste may be made with two-thirds of wheat flour, quarter of the flour of boiled potatoes, and some butter or dripping; the whole being brought to a consistence with warm water, and a small quantity of yeast added when lightness is desired.

POTATO—English balls.—Boil some potatoes very dry; mash them as smoothly as possible; season well with salt and pepper; warm them, with an ounce of butter to every pound of potatoes, and a few spoonfuls of good cream; let them cool a little, roll them into balls; sprinkle over them some crushed vermicelli or macaroni, and fry them a light brown.

POTATOES—Boiled.—It is a good way to pour off the water from boiled potatoes and dry them in the kettle a few minutes before dishing up. Set the kettle again over the fire and shake it back and forth to keep from burning.

POTATOES—Fried.—Raw potatoes are excellent fried in very thin slices. They must be well salted, fried quickly and crisp to be good.

POTATOES—Mashed.—When mashed potatoes are left from dinner, wet them up next morning into balls with a little milk; having salted and peppered them, fry them in a spider.

POTATOES—How to have mealy.—A small piece of fresh lime, put into the pot in which watery potatoes are boiled, will, it is said, render them dry and mealy.

SALAD—Russian.—Russian salad is made by cutting up raw apples and every kind of available vegetable into small slices and laying them in a shallow dish with salt, a little vinegar and pepper, and the best oil. The dressing must thoroughly saturate the mixture for at least twelve hours, and then the effect will be found very agreeable.

SALAD.—The herbs and vegetables for a salad cannot be too freshly gathered. They should be carefully cleared from insects and washed with scrupulous nicety; they are better when not prepared until near the time of sending them to table, and should not be sauced until the instant before they are served. Tender lettuces, of which the outer leaves should be stripped away, mustard and cress, and young radishes, and occasionally small green onions (when the taste of the party is in favor of these last,) are the usual ingredients of summer salads. Half-grown cucumbers sliced thin and mixed with them are a favorite addition with many persons. In England it is customary to cut the lettuces extremely fine; the French,

who object to the flavor of the knife, which they fancy this mode imparts, break them small instead. Young celery alone, sliced and dressed with a rich salad mixture, is excellent; it is still in some families served thus always with roast fowls. Beet-root, baked or boiled, blanched endive, small salad-herbs, which are easily raised at any time of the year, celery and hardy lettuces, with any ready-dressed vegetable, will supply salads through the winter. In summer-salads the mixture must not be poured upon the lettuce or vegetables used in salad, but be left at the bottom, to be stirred up when wanted, thus preserving the crispness of the lettuce.

In winter-salads, however, the reverse of this proceeding must be adopted, as thus: the salad of endive, celery, beet and other roots, being cut ready for dressing; then pour the mixture upon the ingredients and stir them well up, so that every portion may receive its benefit. In doing this it should likewise be recollected that the spoon and fork should always be of wood, and of sufficient size to stir up the vegetables in large quantities.

SALAD-DRESSING.—For a salad of moderate size, pound very smoothly the yolks of two hard-boiled eggs with a small tea-spoonful of unmade mustard, half as much sugar in fine powder, and a salt-spoonful of salt. Mix gradually with these a small cup of cream, or the same quantity of very pure oil, and two table-spoonfuls of vinegar. More salt and acid may be added at pleasure; but the latter usually predominates too much in English salads. A few drops of cayenne vinegar will improve this recipe.

Hard yolks of egg, two; unmade mustard, one small tea-spoonful; sugar, half as much; salt, one salt-spoonful; cream or oil, small cup full; vinegar, two table-spoonfuls. To some tastes, a tea-spoonful of eschalot vinegar would be an acceptable addition to this sauce, which may be otherwise varied in numberless ways. Cucumber vinegar may be substituted for other; and small quantities of soy, cavaire, essence of anchovies or catsup may in turn be used to flavor the compound. The salad-bowl, too, may be rubbed with a cut clove or garlic, to give the whole composition a slight flavor of it. The eggs should be boiled for fifteen minutes, and allowed to become quite cold always before they are pounded, or the mixture will not be smooth; if it should curdle, which it will sometimes do if not carefully made, add to it the yolk of a very fresh unboiled egg. As we have before had occasion to remark, garlic, when very sparingly and judicously used, imparts a remarkably fine savor to a sauce or gravy, and neither a strong nor a coarse one, as it does when used in larger quantities. The veriest morsel (or, as the French call it, a mere *soupoon*,) of the root is sufficient to give this agreeable piquancy; but unless the proportion be extremely small, the effect will be quite different. The Italians dress their

salads upon a round of delicately toasted bread, which is rubbed with garlic, saturated with oil, and sprinkled with cayenne, before it is laid into the bowl; they also eat the bread thus prepared, but with less of oil and untoasted, often before their meals, as a digester.

SAUCE—Caper, to imitate for boiled poultry.—Boil some parsley very slowly to let it become of a bad color, then cut it up, but do not chop it fine, put it into melted butter, with a tea-spoonful of salt, and a dessert-spoonful of vinegar; boil up, and then serve.

SAUCE—German custard, for plum or other sweet boiled puddings.—Boil very gently together half a pint of new milk, or of milk and cream mixed, a very thin strip or two of fresh lemon rind, a bit of cinnamon, half an inch of a vanilla bean, and an ounce and a half or two ounces of sugar, until the milk is strongly flavored, then strain, and pour it, by slow degrees, to the well-beaten yolks of three eggs, smoothly mixed with a knife-endful (about half a teaspoonful) of flour, a grain or two of salt, and a tablespoonful of cold milk; and stir these very quickly around as the milk is added. Put the sauce again into the stew-pan, and whisk or stir it rapidly until it thickens and looks creamy. It must not be placed upon the fire, but should be held over it when this is done.

SAUCE—For game or poultry.—Put into a stew-pan and set on a slow fire a quarter of a pint of white wine, a tablespoonful of vinegar, three tablespoonfuls of olive oil, a bunch of sweet herbs. and spice to taste. Add to the whole some good gravy, and serve hot.

SAUCE—For pudding.—Two ounces of butter, a large tablespoonful of flour, corn-starch or arrow-root, two tablespoonfuls of milk. Put these in a stew-pan, stir well together; when the butter begins to melt, add six tablespoonfuls of hot water. Cover the stew-pan, let it boil up. When of the consistence of cream, pour it out and flavor to taste. Butter mixes best with milk, but in transparent saucers water alone can be used.

SAUCE—Shirley.—12 good-sized, ripe tomatoes; 2 bell peppers (large ones;) 2 onions (many omit these, and like the sauce better—consult your own taste.) Scald and skin the tomatoes; chop the peppers and onions (if used) very fine. Then add 1 cup of vinegar, and $\frac{1}{4}$ of a cup of sugar, and boil 2 hours; then put in another cup of vinegar and boil 1 hour—or until the mixture does not separate. Then stir in 1 teaspoonful of cloves, 1 dessert-spoonful of cinnamon, and a teaspoonful of pimento (allspice.)

SAUCE—Worcestershire.—All the English sauces in popular use are founded upon walnut catsup—that is of English walnuts—or upon mushroom catsup. To make a catsup of walnuts, the green shells are taken in these proportions: 2 gallons walnut juice, 5 pounds salt, mixed and bruised, and allowed to lie a week; the liquor is then pressed out, and to every gal-

lon is added 4 ounces of allspice, 3 ounces of ginger, and of pepper and cloves 2 ounces each, all bruised. The whole is then simmered for 30 minutes, and is then set aside to clear. This is the catsup. To make a sauce of this similar to Worcestershire, take 1 gallon port wine, ¾ gallon catsup, 2 pounds anchovies, with their liquor, 8 lemons, 48 shallots or small onions, scraped horse-radish 1¾ pounds, mace 1 ounce, cayenne 2 ounces, mustard 8 ounces. Boil the whole gently, and then strain and bottle.

SAUCE.—CHUTNEY.—Pare and core sour apples. Then take of these apples, tomatoes, brown sugar, and best raisins, each 8 ounces; salt, 4 ounces; red peppers (chilies) and powdered ginger, 2 ounces each; garlic and small onions, 1 ounce each. Pound the whole well, and add 3 quarts of best cider or wine vinegar—or vinegar made from beer—and 1 quart of lemon juice. Let it stand in the vessel a month, but give it a good shake daily. Then pour off the clear liquid and bottle it. The residue may be used in aid of a second batch of sauce, or, rubbed up into a very smooth paste, may form a constituent of French mustard.

SAUERKRAUT—TO MAKE.—Take a large strong wooden vessel, or cask resembling a salt-beef cask, and capable of holding as much as is sufficient for the winter's consumption of a family. Gradually break down or chop the cabbages (deprived of outside green leaves) in very small pieces; begin with one or two cabbages at the bottom of the cask, and add others at intervals, pressing them by means of a wooden spade against the side of the cask, until it is full. Then place a heavy weight upon the top of it, and allow it to stand near a warm place for from four to five days. By this time it will have undergone fermentation, and be ready for use. Whilst the cabbages are passing the process of fermentation, a very disagreeable, fetid, acid smell is exhaled from them; now remove the cask to a cool situation, and keep it always covered up. Strew anise-seeds among the layers of the cabbages during its preparation, which communicate a peculiar flavor to the sauerkraut at an after period.

In boiling it for the table, two hours are the period for it to be on the fire. It forms an excellent, nutritious and antiscorbutic food for winter use.

Or, shred very finely six white cabbages, having cut out the stalks; mix them with a pound of salt, and press them as closely as possible into a cask; put over a cloth, then a wooden cover, and upon that a heavy weight; let it stand in a warm cellar for two months, keeping the liquor that rises on it, and it will be fit for use. It should then be removed to a cooler place.

In Germany half an ounce of juniper-berries, anise-seed, or caraway-seeds would be added to the above; but this is not recommended for American taste.

SNIPES ROASTED.—Do not draw them, but spit on a bird-spit; flour

and baste well with butter; prepare a slice of toasted bread, lay it in a plate under the birds; roast for about thirty minutes; place them on the toast; butter, garnish with slices of lemon and parsley, and serve.

SODA CAKES.—Mix a teaspoonful of soda and one of tartaric acid with half a teaspoonful of salt; melt five ounces of butter in a large cupful of milk; add these ingredients to one pound of flour, half a pound of moist sugar, and two ounces of caraway seeds.

SHAD—To FRY.—Clean the fish, cut off the head and split down the back; save the roe and eggs when taking out the entrails. Cut the fish in pieces about three inches wide, rinse each in cold water, and dry on a cloth; use wheat flour to rub each piece. Have ready hot salted lard and lay in the fish, inside down, and fry till of a fine brown, when turn and fry on the other side. Fry the egg and roe with the fish.

SOUP—COLORING FOR.—As soups often require coloring, it is well to prepare browning for that purpose. Two baked onions, well browned in the oven and then chopped fine, make an excellent coloring and flavoring. The shells of green peas, dried in the oven until they are brown, but not black, will also answer to brown soup, and will keep all winter if hung in a perfectly dry place.

SOUP—STOCK FOR.—4 pounds of shin-bone, and 1 pound of lean neck of beef, 4 carrots, 1 turnip, 1 stick of celery, 2 parsnips, 2 leeks, 1 onion, 6 cloves, 6 peppers, a bunch of sweet herbs, 1 gallon of water. Cut the meat into slices, crack the bone, and put into an earthen pipkin that will stand the fire, as this makes far better soup than a metal saucepan; add the water and let it stew slowly until the scum rises, and skim it clear; stick the cloves into the onion and then add the vegetables, and let the whole stew slowly till the meat is in rags, which will be in about 8 hours. It must simmer very slowly, for if it boils the meat will not yield the gravy so well, and the stock will be thick in the place of being clear. After it is cold it should be strained through a colander, and kept in a covered pan or jar for use.

SOUP—HERB.—Slice three large, but young cucumbers, a handful of spring onions, and six lettuces; cut the last small. Put into a stewpan eight ounces of butter, and with it the above vegetables; when the butter has melted, cover, and let it stand over a slow fire an hour and twenty minutes. Add as much stock as may be required for the quantity of soup intended to be served; let it boil and simmer for an hour, then thicken with flour and butter, or three table-spoonfuls of cream. If desired to be colored, use spinach juice.

SOUP—MOCK TURTLE.—Take 1½ pounds of lean veal, or tripe (which is best,) cut it into small slices and fry of a delicate brown. Cut the meat

from three cow-heels in tolerably large pieces, then put it with the fried veal or tripe into 1½ pints of weak gravy, with three anchovies, a little salt, some cayenne pepper, three blades of mace, nine cloves, the green part of three leeks, three sprigs of lemon thyme, some parsley and lemon peel; chop these last very fine before using them; let the whole stew gently for three hours, then squeeze the juice of three lemons to it, add three glasses of Madeira wine, and let it stew for one hour more: then skim off the fat and serve.

SOUP—Ox-tail.—Same as gravy soup, adding about three ox-tails, separated at the joints; when the meat upon them is tender, it is done; they must not be over-stewed; add a spoonful of catsup or Harvey sauce, and send to table with pieces of the tail in the soup.

SOUP—Pepper-pot.—Put in a stew-pan three quarts of water, to this add celery, turnips, carrots, lettuce, cut small, also add the bones of cold roast meat of any description, half a pound of bacon, and the same weight of salted pork; stew gently until the meat is tender, taking care to skim when it first boils. Boil half a peck of spinach and rub it through a colander, take the bones out of the soup and add the spinach, with it the meat of a lobster or crab minced, season with plenty of cayenne pepper, and salt to taste. Suet dumplings may be boiled with it, or a fowl, but this is a matter of taste. Mutton or beef may be substituted for bacon or pork; this will be obvious when it is understood that a pepper-pot is presumed to consist of an equal proportion of flesh, fish, fowl and vegetables.

SOUP—Vegetable.—Peel and slice six large onions, six potatoes, six carrots, and four turnips; fry them in a half a pound of butter, and pour on them four quarts of boiling water. Toast a crust of bread as brown and hard as possible—but do not burn it, and put it in, with some celery, sweet herbs, white pepper and salt. Stew it all gently for four hours, and then strain it through a coarse cloth. Have ready thinly sliced carrot, celery and a little turnip. Add them to your liking, and stew them tender in the soup. If approved of, a spoonful of tomato catsup may be added.

SOUP—Gumbo.—Fry a light brown two pounds of the round of beef with four sliced onions; put into the soup pot with four quarts of water, half a can of tomatoes or twelve fresh ones, one teacupful of sliced okra and one green pepper; boil slowly five hours and put through the colander. Throw into the tureen some sippets of fried bread and serve at once.

SOUP—Rice.—Steep some fine rice in cold water for an hour, say four ounces, then boil it, add three quarts of gravy, a pinch of cayenne, a little salt, and boil five minutes.

SOUP—Sago.—Take three pounds of lean beef, a slice of lean ham, and lay them in a stew-pan with a lump of butter, draw the gravy gently,

add two quarts of water, and a sliced onion which has been browned by frying in fresh butter; also add a bunch of sweet herbs, six cloves, a blade of mace, a teaspoonful of allspice, and one of black pepper whole; stew until the soup is rich and brown, then remove the meat, and strain the soup clear, put it into a clean stew-pan, and thicken it to a good consistency with sago.

SOUP—VERMICELLI.—Blanch as the Italian paste, but first give the vermicelli a squeeze to break it a little, or otherwise it will hang disagreeably about the ladle or spoon, in eating, at the risk of spoiling a lady's dress or causing a confused blush. Season as before.

SUMMER SQUASH—TO COOK.—Take them before the seeds begin to harden, wash or wipe them clean, remove the stem and cut in pieces; boil till quite soft; pour off all the water you can; mash as fine as possible, after which put it into a clean cloth or bag, and squeeze out the rest of the water. Turn out into a dish, and season with salt, butter, or thick, sweet cream, and pepper to your taste.

SWEETBREADS—AS CUTLETS.—If you cannot get the heart sweetbreads, you must use the throat. Blanch them for about ten minutes; then put them to cool into cold water; take them out, and dry them in a cloth; then cut, lengthwise, twelve or fourteen pieces for cutlets, making them a nice shape; if you wish for them to be white *saute* cutlets, you must put some butter or lard in your cutlet-pan, a juice of lemon, a little white pepper and salt; do not color them; take them up, and lay them upon white paper to soak up the grease from them; dish them round upon a tureen, pouring the sauce in the middle of them.

TEA—ART OF MAKING.—Use soft water, and be sure it boils. If you are compelled to use hard water, throw into the kettle a pinch of carbonate of soda; but the latter should never be used unless the water requires correction, and then very moderately, for it is apt to destroy the delicate roughness of the flavor. Put your tea into the empty pot, and be sure you use enough. Some persons practice a foolish economy in this matter, and use so little that the product is not much better than plain hot water. Then place the pot before the fire, or on the hob, or still better, on the hot plate of an oven, till the tea is well heated, but of course, not burnt; then pour upon it the boiling water, and a fragrant infusion of good strength is instantly produced.

TOMATO SOUP.—Wash, scrape, and cut small the red part of three large carrots, three heads of celery, four large onions, and two large turnips; put them into a sauce-pan with a tablespoonful of butter and one-half a pound of lean new ham; let them stew very gently for an hour; then add three quarts of brown gravy soup and some whole black pepper,

with eight or ten ripe tomatoes; let it boil an hour and a half, and pulp it through a sieve; serve it with fried bread cut in dice.

TURNIPS—To cook.—Full-grown turnips will take about 1½ hours' gentle boiling; if you slice them, which most people do, they will be done sooner; try them with a fork; when tender take them up and lay them on a sieve till the water is thoroughly drained from them. Send them up whole; do not slice them.

TURKEY—To choose.—In choosing a turkey, the age of the bird is the chief point to be attended to. An old turkey has rough and reddish legs; a young one smooth and black. Fresh killed, the eyes are full and clear, and the feet moist. When it has been kept too long, the parts about the vent begin to wear a greenish, discolored appearance.

TURKEY—Dressing for.—Take dry pieces of bread or crackers, chop them fine, put in a small piece of butter or a little cream, with sage, pepper and salt, 1 egg and a small quantity of flour moistened with milk.

TURKEY—Steamed.—All poultry, after dressing, should remain in cold water from twenty minutes to half an hour, to extract the blood; then hang in a cool place for twenty-four hours, in winter even longer. They will be much sweeter and finer flavored for it. When ready to cook a turkey, see that every pin-feather is taken out, rinse in cold water, and wipe dry with a cloth used for nothing but such purposes; rub the inside with pepper and salt, and fill with oysters, carefully washed in their own liquor to remove bits of shells; sew up the turkey, place in a large dish, and set it in a steamer over boiling water; lay a clean cloth over the steamer and shut the cover on tight, and steam till tender—two and a half hours, or if large, three hours—run a fork into the breast to see if done. If it seems tender, and no reddish juice flows out, it is ready to take up; strain the gravy and put into the oyster sauce, which should be ready while the turkey is cooking, made like stewed oysters, and thickened with farina or butter and flour; let it just boil up and add, if you like it white, a little boiled cream; pour this over the steamed turkey, and serve hot. Or, if preferred, the turkey may be stuffed as for a common baked turkey, and steamed; or it may be stuffed with good plump chestnuts after the skins are removed, and the gravy made with giblets chopped fine, adding a little flour as you chop, and the gravy from the dish stirred to it, and set over the fire to boil up. While the gravy is being made, rub a little butter over and sprinkle the turkey with flour very slightly, and set in a hot oven to brown delicately. Many prefer this to sending to the table right from the steamer with white gravy poured on.

TURKEY—Roast.—It is stuffed with either sausage-meat or fillet of veal stuffing. While roasting, a piece of paper should be placed over the part stuffed, as, being bulky, it will catch the fire, and become scorched;

but keep the heat well to the breast, in order that it may be as well done as the rest of the bird; baste well and froth it up; serve with gravy in the dish, and bread-sauce in a tureen; to the sausage-meat, if used, add a few bread-crumbs and a beaten egg. Turkey is sometimes stuffed with truffles. They are prepared thus: They must be peeled and chopped, and pounded in a mortar. Quantities of a pound and a half will be found sufficient. Rasp the same weight of fat bacon, and mix it with the truffles; stuff the turkey with it. This stuffing is usually placed in the turkey two days previous to the cooking. It is supposed to impart a flavor to the flesh of the fowl. Cut thin slices of fat bacon, and place over the breast of the turkey; secure it with half a sheet of clean white paper, and roast. Chestnuts dressed in the same fashion are found an excellent substitute for truffles. Two hours will roast it.

TURKEY—Stuffing for.—Take some bread crumbs and turn on just enough hot water to soften them; put in a piece of butter, not melted, the size of a hen's egg, and a spoonful of pulverized sage, a tea-spoonful of ground pepper, and a tea-spoonful of salt; there may be some of the bread crumbs that need to be chopped; then mix thoroughly and stuff your turkey.

VEAL CUTLETS—Broiled.—Cut the pieces of veal of an equal thickness; dip them into beaten egg, and sprinkle them with chopped herbs, parsley, mushrooms, grated lemon-peel, and crumbs of bread; broil them to a fine brown color. Make a sauce of butter and flour melted brown, moistened with veal gravy; put into it some button mushrooms, and pour the sauce hot over the cutlets.

VEAL—Stewed.—Divide into portions part of a breast of veal, and fry it of a nice brown in butter. Put into a stew-pan a quart of green peas, together with onions and parsley. When they are tender add some veal gravy, and put in the pieces of veal already fried, and stew the whole gently. Season with salt, pepper, and a tea-spoonful of powdered sugar.

VEAL CHOPS—Breaded.—Take six or seven handsomely cut chops, season them with salt and pepper, and put them into melted butter. When sufficiently soaked put them into beaten eggs, take them out, and roll each separately in bread crumbs; make the chops as round as you can with your hand, and lay them in a dish. When all are breaded, broil them slowly over a moderate fire, that the bread may not be too highly colored. Serve with clear gravy.

VEAL—To roast.—Season a breast of veal with pepper and salt; skewer the sweet-bread firmly in its place; flower the meat and roast it slowly for about four hours before a moderate fire; it should be of a fine brown, but not dry; baste it with butter. When done, put the gravy in a stew-pan, add a piece of butter rolled in brown flour, and if there should be

not quite enough gravy, add a little more water, with pepper and salt to taste. The gravy should be brown.

VEGETABLES—To BOIL.—Vegetables must be carefully cleaned from insects and very nicely washed. Boil them in plenty of water, the water to be boiling before they are put into it, and they should be drained the moment they are cooked enough. If over-boiled they will lose their beauty and crispness. Bad cooks sometimes dress them with meat, which is wrong, except carrots or cabbage with boiling beef. In order to boil vegetables of a good green color, take care that the water boils when they are put in. Make them boil very fast. Do not cover, but watch them, and if the water has not slackened, you may be sure they are done when they begin to sink. Then take them out immediately, or the color will change. Hard water, especially if chalybeate, spoils the color of such vegetables as should be green. To boil them green in hard water, put a teaspoonful of carbonate of soda or potash into the water when boiling, before the vegetables are put in.

VEGETABES—To MAKE TENDER.—When peas, French beans, etc., do not boil easily, it has usually been imputed to the coolness of the season, or to the rains. This popular notion is erroneous. The difficulty of boiling them soft arises from an excess of gypsum imbibed during their growth. To correct this, throw a small quantity of subcarbonate of soda into the pot along with the vegetables.

VENISON—To ROAST.—Spit a haunch of venison, and butter well four sheets of paper, two of which put on the haunch. Then make a paste of flour, butter and water; roll it out half as big as the haunch, and put it over the fat part; then put the other two sheets of paper on, and tie them with pack-thread. Lay it to a brisk fire, and baste it well all the time of roasting. If a large haunch of twenty-four pounds, it will take three and a half hours; smaller in proportion.

VENISON STEAKS—BROILED.—Wash them and wipe them dry. Put them on the gridiron, over a clear fire, and broil them; then season with salt and pepper, and baste them with butter. Serve with currant jelly.

WILD DUCKS—To ROAST.—For roasting a wild duck you must have a clear, brisk fire and a hot spit. It must be browned upon the cut side without being sodden within. To have it well frothed and full of gravy is the nicety. Prepare the fire by stirring and raking it just before the bird is laid down, and fifteen or twenty minutes will do it in the fashionable way; but if you like it a little more done allow it a few minutes longer; if it is too much done it will lose much of its flavor.

BREAD—How TO MAKE GOOD.—One great difficulty with many housewives is "bread," and to overcome that we give a few good suggestions: Bread made of hop yeast and water is the healthiest, most palatable, and

requires less labor than any other kind. Milk-rising is whiter, and looks better when freshly cut from the loaf; but it needs to be watched very carefully when rising to be taken at the exact moment of fermentation, and dries quicker than that made from hops; moreover, the smell of it, after being closely shut up, is not pleasant.

Sour milk bread we discard entirely for the quantity of saleratus which it requires. The best medical authorities tell us that this drug is a slow poison. It is difficult for housekeepers to discard it entirely, but the less we use the better for the health of our families.

Cream of tartar and soda bread is liable to the same objections; and, moreover, the appetite soon wearies of it.

Potato yeast is nutritious and palatable, makes a light, spongy loaf, and rises quickly, but does not keep as well as hop-yeast. We never succeed well with this unless we have hop-yeast to work it with; but grated potatoes, or potatoes boiled and sifted, and added to the yeast, make a pleasant addition to the dough.

Without good yeast we cannot succeed in bread-making. The following is our method: A tea-cup of hops, thrown into a quart of boiling water; let it boil three or four minutes; strain; thicken with wheat flour; add a tea-spoonful of sugar, and, when lukewarm, a tea-cup of yeast. This, if placed in a moderately warm place, will be ready to use in three hours. Many housekeepers say that they keep their yeast three or four weeks. We prefer to make it as often as once a week, as it requires less soda; and we fancy that new yeast makes the best bread. A tea-cup of this yeast, in two quarts of flour, will make a dough ready to mold in three hours. We have a small wooden rack on purpose to hold pans of bread when rising, and find it quite an aid in our kitchen. It is made of slats and is suspended above the stove, so that the hot air rises and passes freely around the pans. It will hold three loaves, one above another; and if one wishes to be very exact, a thermometer hung near will soon teach us the proper temperature for raising the bread in the shortest time. Some experience is necessary in ascertaining the proper time for placing the bread in the oven. When not quite light enough, it cracks or runs over in the oven; if it rises too much, the sweetness of the dough is lost. It should not stand long enough to acquire a sharp, acid taste, but should be light and puffy to the touch. A common-size brick loaf requires fifty minutes' baking in a stove just hot enough not to burn the crust. Too slow a fire spoils bread. A good, rich, even, brown crust is produced in the time mentioned. A slack-baked loaf looks to us very much like an untidy morning-dress, loosely put on. Some say the bread is tender not to be thoroughly baked. We are sure it will make very tender stomachs. The

kneading of bread requires some practice. Cutting it with a knife when on the board, and working it lightly, and with quick movement, for fifteen minutes, improves the loaf, making the air-cells uniform. Bread with large holes, like a house with cracked ceilings, and doors that gape when fastened, shows lack of skill in the maker.

We have spoken only of bread made of fine wheat. It is an addition to the table, and we think beneficial to the health, to have some coarser bread for variety.

BREAD—FAMILY.—Take one quart of sifted flour, and half a pint of lukewarm water; mix these into smooth batter, and stir into it half a gill of yeast, cover it with flour, and set to rise. When it is light, add a little salt and a quarter pound of lard, and knead all well, with sufficient flour to form a soft dough; form this into loaves, place them in pans, and set to rise again; when light, bake.

To one pint of flour add one gill of yeast, and make this up with tepid milk or lukewarm water into a soft paste; then cover it with about a pint of flour, and set it to rise in a warm place, and when quite light work well in two quarts of flour, and milk sufficent to make it into a stiff dough, adding a little salt; knead it well and set to rise again. Bake in pan.

Use soda or saleratus dissolved in a little milk.

BISCUITS.—A very good biscuit may be made as follows, without the use of ferment; they are called Maryland biscuit, and if well made are nice for breakfast or tea. Take any desired quantity of flour, put in salt, and a lump of lard; rub it well into the flour, and moisten it with sweet new milk; work it well, and beat it with a rolling-pin until perfectly light. Bake in a moderate oven to a light brown color.

BREAD—POTATO.—Take four or five good mealy potatoes, and after boiling, peel and mash well; add a large spoonful of flour and enough hot water to make a thin batter; when cool enough add a small quantity of good yeast and a spoonful of sugar; set to rise in a moderately warm place, say by the stove or fire-place; it rises very quickly. When risen, take two large spoonfuls of it for one pint and a half of flour, a small spoonful of lard or butter, a one-half pint of milk, and hot water enough to make it into a stiff batter, (over night;) beat well; next morning work it well into a smooth dough and make into rolls or loaves; set in a warm place to rise again, and bake in a quick oven. Do not forget a teaspoonful of salt and one of yeast powder sifted in the dry flour that you work into the batter in the morning; a tin bucket is best, with a tight cover, and a towel between it and the bucket. If your flour is good, there is no better recipe than this; no hops are needed.

BREAD—RICE.—Take one pound of rice, and boil it gently to a thick

paste, which, when mixed with the usual quantity of yeast, will be sufficient to make five pounds of wheat or barley meal into a dough. When risen, bake it in the usual way.

BREAD—Rye.—Scald one cup of flour with one cup of boiling water, half a teaspoonful of salt, four tablespoonsful of molasses, a large cup of yeast, three cups of rye, six cups of flour, three cups of warm water; stir well with a spoon, set it to rise twelve hours.

BREAD—Sago.—This light and nutritious article for invalids is made in the following manner: two pounds of sago to be well soaked in water or milk for several hours; mix it with as much flour; add salaratus and good yeast, (a little Indian meal if liked;) when well raised give it a handsome bake. It is delicious, healthy and cheap.

BREAD—Brown.—Take two quarts of Indian meal, one quart of wheat flour, one and a half cups of molasses, one tablespoonful of soda, sour milk enough to mix it quite stiff; put it promptly into the oven, and bake an hour. It makes six bars.

FLOUR—How to select.—First —Look at its color; if it is white with slightly yellowish or straw-colored tint, it is a good sign. If it is very white with a bluish cast, or with black specks in it, the flour is not good. Second.—Examine its adhesiveness—wet and knead a little of it between the fingers; if it works dry and elastic, it is good; if it works soft and sticky, it is poor. Flour made from spring wheat is likely to be sticky. Third.—Throw a little lump of the dry flour against a dry, smooth, perpendicular surface, if it adheres in a lump, the flour has life in it; if it falls like powder it is bad. Fourth.—Squeeze some of the flour in your hand; if it retains the shape given by the pressure, that too is a good sign. Flour that will stand these tests it is safe to buy. These rules were given by old flour-dealers, and we make no apology for printing them, as they pertain to a matter that concerns everybody, namely, the quality of that which is the "staff of life."

BREAD—Boston Brown.—Take 2 cups corn-meal, 2 cups sour milk, 1 cup wheat-flour, $\frac{1}{2}$ or $\frac{2}{3}$ of a cup molasses, 2 teaspoonsful soda; steam briskly $2\frac{1}{2}$ hours; bake slowly $\frac{1}{2}$ hour.

BREAD—Graham.—Housekeepers who have no gem-pans can make very nice warm Graham bread for breakfast in several ways. Make a dough of Graham flour and sweet milk (skimmed or creamy, as you prefer, or find convenient,) stiff enough to roll out easily. Knead this a little, roll it an inch thick, and cut it into diamonds; or cut off strips and make it into rolls with the hand; or roll it into balls two inches in diameter, flattening them a little or not at all, as you choose; or roll the dough very thin and cut it into square crackers, picking them well to prevent their puffing.

Crackers are best with some cream in the mixing, and crackers require more kneading than diamonds and rolls, which are expected to be soft inside.

Any of these kinds of bread—diamonds, rolls, balls, and crackers—are baked upon the grate in the oven, which should be wiped off clean. They will not stick to it, and will bake very fast. We recommend the crackers in particular. All these breads are sweeter and better, we think, without salt, but most people prefer salt in their crackers.

BREAD—Graham.—To 1 quart of buttermilk add ½ cup of sweet milk, ½ cup molasses, 1 tablespoonful soda dissolved in the milk, a little salt; thicken with unsifted Graham to the consistency of common cake mixtures; bake in a slow oven until a broom splint will not adhere. This makes one large loaf.

BREAD—To keep moist.—Place in the bread pan a board pierced with holes, and so supported as to be a couple of inches from the bottom of the pan; let there be an inch depth of water in the pan; put the bread on the board, and cover the pan with the lid. The inclosed air will then prevent the bread from becoming too dry.

BREAD—Corn.—1 quart of buttermilk, 1 quart of Indian meal, 1 quart of coarse flour, 1 cup of molasses; add a little soda and salt.

Another.—To 2 quarts of meal add 1 pint of bread sponge; water sufficient to wet the whole; add ½ pint of flour and a tablespoonful of salt; let it rise; then knead well for the second time, and place the dough in the oven, and allow it to bake an hour and a half.

Another.—2 cups corn-meal, 1 cup flour, 2 eggs, 1 quart milk (if not sufficient add a little water,) 1 good tablespoonful of butter, melted, tablespoonful of syrup. Mix meal and flour together with a little salt, and about 5 teaspoonfuls of yeast powder. Mix well with the milk, add the eggs beaten, then the butter, last the syrup. Should be a good thick batter. Grease your tin pans well; 15 to 20 minutes to bake.

BUNS—Lemon.—Take two pounds fine flour, one-half pound sugar, four ounces butter, two eggs, three-fourths of a pint of buttermilk, six drachms of carbonate of soda, and ten or twelve drops essence of lemon. Mix the same as tea-cakes, and bake fifteen minutes.

CARAMEL—Chocolate.—Not quite a half-pound of Baker's sweet chocolate grated fine, a quarter of a pound of butter, a teacupful of cream. After allowing it to come to a boil, cook it for thirty minutes, stirring diligently all the while. Put in one tablespoonful of extract of vanilla just before taking the candy off the fire. Spread thin on buttered dishes, and with a knife dipped in cold water mark off into small square cakes.

CHARLOTTE—Apple.—Take a square loaf of baker's bread, cut into thin slices of bread and butter (fresh butter.) Peel, core, and cut up suf-

ficient of nice baking apples in proportion, the number determined by the size. Take a pie-dish, line it with bread and butter, crust and all. Next make a layer of apple at the bottom; then of sugar; then of bread and butter, and so on till the dish be filled. It must be baked enough to render the apple perfectly soft and mellow. Before serving to table, turn it out in a dish. It ought to keep its shape, and eat almost like a sweetmeat, all the ingredients being thorougly blended in the baking process.

CARAMELS—CHOCOLATE.—Three pounds white or brown sugar (brown preferred,) one pound chocolate, one pint milk, half pound butter, and vanilla to taste at the last; cook until the edges of the pan become a little sugary, then pour into shallow pans well greased.

CAKE—MAKING.—For making cake, one should have a good-sized bowl, a strong wooden spoon, a good egg-beater, fine sifted flour, fresh eggs, the sweetest butter, powdered sugar and flavoring. But these are not all the requisites. A wooden spoon is useless without a strong untiring arm to wield it; and the finest of flour, the best of butter, the freshest of eggs will avail nothing unless properly mixed.

In what manner is cake properly mixed? Experience has taught us that the following is a good rule: First, beat the butter and sugar together for a very long time, until the mass has the appearance and texture of ice cream.

It is surprising how the bulk appears to increase with long continued beating. We were once shown two cakes, containing precisely the same quantity of materials, and the one which had been stirred half an hour longer than the other was one-third larger and was in far greater proportion lighter and more delicate.

After the butter and sugar are creamed as above directed, separate the yolks and whites of the eggs. Beat the former until all the large bubbles disappear, and stir into the butter and sugar. Next the requisite quantity of flour is stirred in, and if milk is used it should be added. Then beat the whites of eggs until very stiff, and add them, stirring all the time. Next the flavoring extract is put in, and, last of all, the baking powder.

Stir this mixture faithfully, and have ready a buttered pan, which should be lined with white paper; drop the batter into it; smooth it around evenly and set it in a moderate oven. If the oven is too hot, the cake will rise unevenly and be apt to split across the top. It is a good plan to bake cake after bread has been baked in the oven.

If you feel doubtful of a cake before baking, and wish to try it, before putting in the baking powder take out a spoonful of the batter into a pie-pan and stir into it about half a thimbleful of baking powder and set in the oven. It is a bad plan to stir the baking powder into the whole and let it stand while you are baking some.

There are cake-makers who discard the use of baking powders—using soda and cream of tartar instead. Our own experience leads us to prefer the former, as being less troublesome, and quite as effective. It must be stirred in thoroughly, however, or the cake will be very porous, and consequently will soon get dry.

CAKE—How to know when done.—You can always know whether cake is done or not by holding it near the ear. If it "sings," there are little bubbles of water-boiling inside, and all is not hardened; if it is silent the cake is done.

CAKE—Apple fruit.—Take two cups of dried apples; having soaked them over night, cut them up in small pieces and boil soft; add three cups of molasses and boil three minutes; then add one teacupful of shortening (half fresh lard and half butter is best), one teacupful of sour milk, and one large teaspoonful of soda, two eggs when the apples are cool; spices to taste; put in the oven and bake.

CAKES—Buckwheat are many times better, and more wholesome when made light and thin; at night mix the flour with milk, warm water, a little salt, a half teacupful of good yeast into rather a stiff batter and set it in a warm place to rise. In the morning thin the batter with milk and add soda dissolved in hot water. They ought not to be baked up in large quantities and pitched into a deep dish—that makes them heavy—but laid in neat piles on a flat plate, and baked as fast as needed at the table.

CAKES—Buttermilk.—To two pounds of flour rub one of butter; add three-quarters of a pound of currants; two ounces of candied peel; one pint of buttermilk, and one ounce of carbonate soda. Mix and beat them well together, and bake in a tin. This makes a splendid cake.

CAKE—Cocoanut.—Break 8 eggs, of which set aside four whites. Beat separately the remaining four whites and eight yolks till very light. 1¼ pounds of flour, sifted; 1 pound of sugar, pulverized; ½ a pound of butter, creamed; one cup of sour cream or buttermilk, and a teaspoonful of bicarbonate of soda—the two latter ingredients to be added the last thing, just before you are ready to bake. Bake in large flat tin plates, so as to form many thin cakes. Grate two fresh, sweet cocoanuts, and add to them 1 pound of sifted white sugar, with the lightly beaten whites of the 4 eggs laid aside for the purpose; 2 teaspoonfuls of corn-starch. Stir all well together, including the cocoanut milk drained from both nuts. When the cakes are quite cold, place one in the bottom of a large china plate, cover it well with the prepared cocoanut, and continue thus to heap up cake and cocoanut in alternate layers, until all of each material is consumed. If for any other than every-day use, cover the whole with icing. This quantity makes a very large cake. If only a small one is needed, one cocoanut will

answer, with half of everything else. This recipe supplies a cake of delicate yet luscious flavor, and not otherwise than economical in its proportions.

CAKE—Chocolate.—2 eggs, $\frac{2}{3}$ cup of butter, 2 cups sugar, 1 cup sweet milk, 3 cups flour, 2 teaspoons baking-powder; bake in layers. Take a cup and a half of white coffee sugar, put enough water on to just cover it, and boil until it is as thick as syrup; beat it until it begins to look white like cream, then flavor with vanilla, and spread on a coating of chocolate which has been melted by holding a hot stove griddle over it, or in the oven; stir the chocolate smooth before putting on.

CAKE—Delicate.—1$\frac{1}{2}$ cups powdered sugar, $\frac{1}{2}$ of butter, 1$\frac{1}{2}$ of flour, $\frac{1}{2}$ cup corn-starch sifted with the flour, $\frac{1}{2}$ cup milk, the whites of 6 eggs beaten to a froth, one small teaspoon cream-tartar, $\frac{1}{2}$ teaspoon soda; flavor with almond or vanilla; bake in a moderate oven.

CAKE—Fruit.—One pound of sugar and three-fourths of a pound of butter worked together until very light; one wine-glass full of brandy; one dozen cloves, ground; half a nutmeg; one teaspoonful of ground cinnamon; ten eggs, beat separately, the yolks to be used first, and afterward the whites; one-fourth of a pound of sliced citron; two pounds of washed currants, rubbed in flour, and mixed in the cake with one pound of rasins, cut fine, and one pound seeded and left whole or cut once, and one pound of sifted flour. Stir in the citron, currants and the chopped rasins, and lastly, the flour and the whole raisins alternately. Bake in a moderate oven, in deep basins, two hours. If the fire is strong the heat should be decreased the last hour. Line the basins with buttered paper, and keep a piece over the top of the cake. Frost it, and it will keep three months or longer.

CAKES—Flannel.—Mix three tablespoonfuls of flour with half a pint of cream; add two eggs, and beat the whole well till quite smooth; then add slowly half a pint of new milk, into which has been put a teaspoonful of baking powder. Beat all well together, and fry with lard, a little of which should be made hot for each cake. Eat with powdered sugar, mixed with cinnamon or grated nutmeg.

CAKES—Ginger.—Make a paste with sugar, one pound; powdered ginger, four ounces; flour, two pounds; water, one pound; butter, quarter pound; and one cup of candied orange peel, grated; form them into cakes, and prick them with a fork before baking them.

CAKE—Gold.—One pound of sugar, one pound of flour, three-quarters of a pound of butter, and the yolks of sixteen eggs; you may add a little saleratus or soda. Bake in shallow tins and cut in squares.

CAKES—Greaser for.—The following is a substitute for greasing the griddle: Take a turnip, cut in half, rub the griddle with the inner side,

and it is said that the cakes will come off nice and smoothly, and the housekeeper will be rid of the disagreeable odor of burning fat.

CAKES—Griddle, wheatmeal.—Make a porridge with about three heaping spoonfuls of oatmeal, hominy, rice, or very coarse corn meal, in a pint of water. Boil twenty or thirty minutes, or if you have either of these articles already cooked, it can be made much quicker. Add one pint of cold water and wheat meal, sifting it slowly, enough to make a batter a little thicker than for raised griddle cakes. Bake on slightly oiled or a soapstone griddle, spreading out with the spoon as you put them on. Bake them brown, and put them on each other as fast as cooked. Keep them close and warm, and let them stand ten or fifteen minutes before serving. If soft and sticky after standing, you have made them too thin.

CAKE—Corn.—1. One pint of buttermilk, one pint of corn meal, two beaten eggs, one teaspoonful of soda; beat well together and bake in shallow tin pans. Increase quantities for more than four or five persons. 2. A pint of buttermilk or sour milk, a pint of corn meal, one egg, a teaspoonful of soda, one of salt, two of sugar or molasses. Dissolve the soda in a little warm water, and add it the last thing. Bake half an hour in a quick oven.

CAKES—Lemon.—Flour and sugar, of each one pound; eggs one dozen; grated peel and juice of four lemons; whisk the eggs to a high froth, and then gradually add the rest. Bake in small oval tins, well buttered, and place six thicknesses of paper beneath each tin. Thinly ice them.

CAKE—Jackson sponge.—One heaping teacupful of flour, one teaspoonful of cream of tartar, one cup of sugar, three eggs, one-quarter teaspoonful of soda dissolved in a tablespoonful of hot water; flavor with extract of lemon; beat together thoroughly and bake 15 or 20 minutes. It makes two bars of cake.

CAKE—Jelly.—Three-quarter pound sugar, half pound butter, one cup sour milk, half teaspoonful soda stirred into the milk, six eggs, one pound flour; stir this well together. Bake in tin pans not more than half an inch thick; when baked, as you take them from the oven, lay them on a flat surface, spread over a layer of jelly on the top, then lay on another cake, then jelly, then cake; keep the best looking for the top; cut it in square pieces.

CAKE—Farmer's jelly.—Take one cup of sugar, three eggs, four tablespoonfuls melted butter, four tablespoonfuls sweet milk, two teaspoonfuls baking-powder, mixed with $1\frac{1}{2}$ cups of sifted flour; flavor with lemon. This makes four layers of cake.

CAKE—Poor man's.—This receipt, published some time ago in the

Country Gentleman, has been tried and approved: Break two eggs into a teacup, beat, fill up the cup with good sour cream, one cup of sugar, two cups of flour, small teaspoonful of soda or saleratus, a little salt; flavor to the taste, beat well, bake quick.

CAKE.—Rice.—Mash up cold boiled rice, add flour enough to hold together, two eggs and two teaspoons yeast powder; add sugar to sweeten; drop from a large spoon into boiling fat: when done brown, lift into a colander to drain; when you serve, sprinkle with white sugar. You can omit sweetening if preferred.

CAKE—Sponge.—Take five eggs, and half a pound of loaf sugar sifted; break the eggs upon the sugar, and beat all together with a fork for half an hour. Previously take the weight of two and a half eggs, in their shells, of flour. After you have beaten the eggs and sugar the time specified, grate in the rind of a lemon (the juice may be added at pleasure,) stir in the flour, and immediately pour it into a tin lined with buttered paper, and let it be instantly put into rather a cool oven.

CAKE—Sponge.—Four eggs, one cup of sugar; beat the yolks and sugar together until very light; beat the whites separately; one cup of flour in which has been sifted one teaspoonful of baking-powder; flavor to taste.

CAKE—White cup.—One cup of fresh butter, two cups of powdered white sugar, four cups of sifted flour, five eggs, one cup of sour cream or rich milk, soda to sweeten, a grated nutmeg, and a teaspoonful of cinnamon. Bake in small tins.

CAKE—Wedding.—Take four quarts of flour, three pounds of butter, three of sugar, four of currants, two of raisins, two dozen of eggs, one ounce of mace, and three nutmegs, a little citron and molasses improve it. Bake about three hours.

CAKE—White.—One cup of butter, two cups fine white sugar, beat butter and sugar to a cream, add whites of eight eggs beaten to a froth, three cups of flour, one teaspoonful soda dissolved in a teaspoonful of vinegar, and lastly add one cup of sour cream, and bake quickly. This cake is splendid when made right.

CREAM COOKIES.—One teacup of sour cream, two cups of sugar, one egg, teaspoon of saleratus, flour to roll out, nutmeg or seeds.

COOKIES.—One cup of sugar, two-thirds cup butter filled with water, one egg, half teaspoon soda dissolved in a tablespoon of hot water; mix soft, roll quite thin, cut any desired shape, and bake in a quick oven.

CREAM FRITTERS.—Mix a pint and a half of wheat flour with a pint of milk; beat six eggs to a froth and stir them into the flour; grate in half a nutmeg, add a pint of cream, a couple of teaspoonfuls of salt. Stir the

whole just long enough to have the cream get well mixed in, then fry the mixture in small cakes.

CREAM TOAST.—Make some dry toast, have a saucepan of milk boiling, into which put quarter pound of butter, stir into this sufficient flour or corn-starch (already wet with cold milk) to make it as thick as rich cream. Dip each slice of toast into this. Put into a deep dish, and pour the cream over it.

CREAM PUFFS.—Half pint boiling water, one cup of butter, two cups of flour. Let the water and butter boil, then stir in the flour. Let it cool. Add five eggs, well beaten. Beat all well. Drop in muffinrings. Bake thirty minutes. Boil one pint of milk. Beat together one cup of flour, one cup of sugar and two eggs; add this to the boiling milk and boil three minutes; cut a hole in the top of each cake and fill with cream, putting the piece of crust back.

GINGER CRACKERS.—To two quarts of flour, moistened with one quart of molasses, add a heaping tablespoonful of butter, one tablespoonful of ground ginger, and a teaspoonful of cinnamon. Dissolve one teaspoonful of bicarbonate of soda in a little buttermilk or sour cream. Roll out thin, cut into shapes with cake-cutters, and bake quickly.

ALMOND CREAM.—Boil one quart of cream with a grated nutmeg, a blade or two of mace, a bit of lemon peel, and sugar to your taste; then blanch one-quarter of a pound of almonds, and beat them very fine with a tablespoonful of rose-water or orange-flower water; beat well the whites of nine eggs, strain them to the almonds; beat them together and rub them well through a coarse hair-sieve; mix it with the cream; set it on the fire, and stir it all one way until it almost boils; pour it into a bowl and stir it till cold. Put it into cups or glasses and send it to table.

BURNT CREAM.—Set over the fire in a pan three ounces of sifted sugar, stir it, and when it browns, add a quart of cream and two ounces of isinglass; boil and stir till the latter is dissolved, when sweeten it, and strain into molds.—Or, this cream may be made by boiling it without sugar, adding the yolks of four eggs, sweetening and sifting over it in a dish loaf-sugar, to be browned with a salamander.

CREAM—Bleached.—Take a quart of the thickest cream that can be got; sweeten it with fine sugar and orange-flower water; boil it and beat the whites of twenty eggs with a little cold cream; strain it, and when the cream is upon the boil, pour in the eggs, stirring it well till it comes to a thick curd; then take it up and strain it again through a hair-sieve, beat it well with a spoon till it is cold, and put into a dish.

CREAM—Custard.—Boil half a pint of new milk with a piece of lemon-peel, not very large, a stick of cinnamon, and eight lumps of white

sugar. Should cream be employed instead of milk, there will be no occasion to strain it. Beat the yolks, say of four eggs; strain the milk through coarse muslin or a hair-sieve; then mix the eggs and milk very gradually together, and simmer it gently on the fire, stirring it until it thickens, but removing it the moment it begins to boil, or it will curdle. A cheap and excellent sort is made by boiling three pints of new milk with a bit of lemon-peel, a bit of cinnamon, two or three bay leaves, and sweeten it. Meanwhile, rub down smooth a large spoonful of rice-flour into a cup of cold milk, and mix with it four yolks of eggs well beaten. Take a basin of the boiling milk, mix it with the cold, and pour that to the boiling, stirring it one way till it begins to thicken, and is just going to boil up; then pour it into a pan and stir it some time.

CREAM—Codling.—Pare and core a score of codling apples; beat them in a mortar with a pint of cream; strain it into a dish, and put sugar, bread-crumbs, and a glass of wine to it. Stir it well.

CREAM—Hasty.—Take a gallon of milk from the cow, set it on the fire, and when it begins to rise take it off the fire, skim off all the cream and put it on a plate, then set the skillet on the fire again and repeat the skimming till your plate is full of cream; put to it some orange-flower and sugar, and serve it.

CREAM—Italian.—A beautiful and elegant Italian cream may be prepared at the small cost of one quart of milk, six eggs, with a little flavoring and sugar. Besides these ingredients there are required a shallow stew-pan and skimming-spoon (or, in default of such an article, a fish-slicer will serve if thoroughly clean,) two bowls and a fork. Set a quart of milk, sweetened with white sugar, on the fire in the stew-pan to boil; in the meantime break the whites of six eggs into one bowl and the yolks into the other. Beat up the whites to a high froth, and as soon as the milk boils take with the skimming-spoon large flakes, whip and lay them lightly on the boiling milk. After letting them boil for a few minutes repeat the operation with the remainder of the whites until all has been set, and pile it high in the centre of a glass dish. Make a custard with the yolks of the eggs and the milk, flavoring it with lemon or vanilla, and pour it round the snowy pyramid. It will maintain its place well many hours, and may be still further embellished according to taste by dipping some of the top flakes with the least possible quantity of cochineal essence.

CREAM—Lemon.—A large spoonful of brandy, six ounces of loaf-sugar powdered, the peel and juice of two lemons, the peel to be grated. Mix these ingredients well together in a bowl; then add a pint of cream, and whisk it up.

CREAM—Pine Apple.—Have some pine-apple prepared in syrup, and

cut into small dice, putting it in your cream, with a little of syrup, the other process as before.

CREAM—Raspberry.—Put six ounces of raspberry jam to a quart of cream, pulp it through a lawn-sieve, add to it the juice of a lemon and a little sugar, and whisk it till thick. Serve it in a dish or glasses.

CREAM—Strawberry.—Put six ounces of strawberry jam with a pint of cream through a sieve, add to it the juice of a lemon, whisk it fast at the edge of a dish, lay the froth on a sieve, add a little more juice of lemon, and when no more froth will rise, put the cream into a dish, or into glasses, and place the froth upon it, well drained.

CREAM—To whip.—Sweeten a bowl of cream with loaf-sugar, and flavor it with orange-flower water, any juicy fruit, or lemon or orange, by rubbing sugar on the peel; set another bowl near the above, with a sieve over it; then whip the cream with a whisk, and as it rises in a froth, take it off with a skimmer, and put it into the sieve to drain; whip also the cream which drains off, and, when done, ornament with lemon raspings. This cream may be used before it is set upon custards, trifle or syllabub.

CRUMPETS.—Place two pounds of flour, with a little salt, before the fire till quite warm. Then mix it with warm milk and water till it is as stiff as it can be served; let the milk be as warm as it can be borne with the finger; put a cupful of this with three eggs, well beaten and mixed, with three spoonfuls of very thick yeast; then put this to the batter, and beat them all together in a large pan or bowl; add as much milk or water as will make it into a thick batter; cover it close and put it before the fire to rise; put a small piece of butter in a piece of thin muslin, tie it up and rub it lightly over the iron hearth or frying-pan; then pour on a sufficient quantity of batter at a time to make one crumpet; let it do slowly, and it will be very light. Bake them all the same way. They should not be brown, but of a fine yellow color.

CUPS—Rice.—One quart of sweet milk, one cup of rice, well washed, then boiled tender in water, and set away to cool; two ounces of butter. Put your milk on to boil, reserving a little to add to your rice, put the butter into the milk while it is warm, and then stir it into your rice batter, adding a little salt, and let the whole simmer gently twenty minutes. Rinse your custard cups with cold water, half fill them with the mixture, and when it becomes cold they will turn out and retain their form. They look very pretty, and are to be eaten with white sugar, nutmeg and cream.

CURD—Naples.—Put into a quart of new milk a stick of cinnamon, boil it a few minutes, take out the cinnamon, and stir in eight well-beaten eggs and a tablespoonful of white wine; when it boils again, strain it through a sieve; beat the curd in a basin, together with about half an

ounce of butter, two tablespoonfuls of orange-flower water, and pounded sugar sufficient to sweeten it. Put it into a mold for two hours before it is sent to table. White wine, sugar and cream may be mixed together and poured around the curd, or it may be served in a sauce tureen.

CURD AND CREAM.—With about half a tablespoonful of rennet, turn two quarts of milk just from the cow; drain off the whey, and fill a mold with the curd; when it has stood an hour or two, turn it out. Strew colored comfits over it, sweeten some cream, mix grated nutmeg with it and pour it around the curd.

ANOTHER.—Take a pint of boiled apples, and mash them as fine as possible; add the yolks of six and the whites of three eggs, well-beaten; one teacupful of cream, a little rose-water, some nutmeg, cinnamon, and a small lump of butter; mix all together and sweeten it well. Then make a good crust, pour in the mixture and bake in the oven.

CUSTARD—CHOCOLATE.—Dissolve gently by the fire an ounce and a half of the best chocolate in rather more than a wine-glassful of water, and boil it until it is perfectly smooth; mix it with a pint of milk well flavored with lemon-peel or vanilla, and two ounces of fine sugar, and when the whole boils, stir to it five well-beaten eggs that have been strained. Put the custard into a jar or jug, set it into a pan of boiling water, and stir it without ceasing until it is thick. Do not put into glasses or dish till nearly or quite cold. These, as well as other custards, are infinitely finer when made with yolks only of the eggs.

CUSTARD—LEMON.—May be made as follows: stir three wine-glassfuls of lemon juice, with one-quarter pound of powdered loaf-sugar, a glass of white wine, and half a wine-glass of water, with a little grated lemon peel. Mix all together, and put the ingredients into a saucepan on the fire, stirring it until it becomes thick and of a proper consistence.

CUSTARD—POTATO.—A cupful of mashed potatoes, four eggs, as much sugar as you like, enough milk to mix, and flavor with essence of lemon.

CUSTARD—RICE.—Sweeten a pint of milk with loaf-sugar, boil it with a stick of cinnamon, stir in sifted ground rice till quite thick. Take it off the fire; add the whites of three eggs well beaten; stir it again over the fire for two or three minutes, then put it into cups that have lain in cold water; do not wipe them. When cold, turn them out, and put them into the dish in which they are to be served; pour round them a custard made of the yolks of the eggs and a little more than half a pint of milk. Put on the top a little red currant jelly, or raspberry jam. A pretty supper dish.

CUSTARD—SAVORY.—Beat three eggs into one and a half gills of

cream; season to taste with salt, pepper, cayenne, chopped parsley, sweet herbs and shallot. Add to these some chopped ham and tongue. Pour in small round cups, and steam ten minutes.

DOUGHNUTS.—One pint of sour milk, soda sufficient to sweeten, one cup of sugar, seven tablespoonfuls of melted lard, two eggs, and flour enough to mix up soft.

DOUGHNUTS.—One egg, one cup of sugar, two of sour milk, one tablespoonful of soda, enough flour to make them just hard enough to roll out; make into round cakes and drop into very hot lard.

FLOAT.—Into one quart of rich, sweet milk, boiling hot, stir the following ingredients that have previously been well beaten together: Two large spoonfuls of sugar, two small spoonfuls of corn-starch, and the yolks of four eggs. Stir rapidly until it boils, and pour immediately into a dish. Have the whites of the eggs beaten to a stiff froth and sweetened a little. Spread them over the dish, and set it a few minutes in the oven. Don't brown. Flavor with nutmegs.

FRITTERS.—Are made of batter the same as pancakes. Drop a small quantity into the pan, have ready apples pared, sliced, and cored, lay them in the batter and fry them; they may also be made with sliced lemon or currants, the latter is particularly palatable. They should be sent to table upon a folded napkin in a dish; any sweet-meat or dried fruit will make fritters.

FLOATING ISLAND.—Six eggs; separate the yolks and white; beat the whites to a froth; then add two cups of sugar; beat the yolks and sugar together; take one quart of sweet milk, boil it, and dip in the whites; just boil up, and skim them out, and turn the sugar and yolks in the milk, and let that boil, and that makes the custard; then lay the whites on top of that; then it is done.

JUMBLES.—Rub to a cream a pound of sugar, and half a pound of butter; add eight well-beaten eggs, essence of lemon or rose-water to the taste, and flour to make the jumbles thick enough for rolling out. Roll out in powdered sugar, about half an inch wide and four inches long, and form them into rings by joining the ends. Lay them on flat buttered tins and bake in a quick oven.

JUMBLES—Cocoanut.—One pound of butter, three-quarters of a pound of sugar, three eggs, one pound of flour; add by degrees a grated cocoanut, so as to form a stiff dough. Bake in a quick oven.

BLANC MANGE.—Season one quart of rich cream with five ounces fine white sugar and a few drops of extract of vanilla or any other flavoring extract preferred. Whip it to a stiff froth. After soaking one ounce of isinglass or gelatine in one pint of cold water for half an hour, let it

simmer on embers until perfectly dissolved, stirring from time to time to prevent the gelatine from sticking to the bottom of the stewpan and burning. When lukewarm, pour the cream slowly in, beating all the time until stiff enough to drop from a spoon, then put it in molds previously dipped in cold water.

MUFFINS.—One pint of milk, one tablespoon of butter, one pint of flour, a small teaspoon of salt, three eggs, the whites and yolks beaten separately and very stiff; a small teaspoon even full of soda; add the whites last, beat smartly and perfectly free from lumps. Butter the griddle, and bake in well-buttered rings. When the bottom is done, turn over the ring and bake the top, or put the rings on a well-buttered bake-pan, and bake in a quick oven.

MUFFINS.—One and a half pints new milk, one egg, one tablespoon sugar, one tablespoon butter, one teaspoon salt, one cake yeast, or better, half cake home-made yeast, mix with flour until a very stiff batter is formed; leave in a warm place during the night and bake in the morning in rings.

GINGER NUTS.—Two quarts of molasses, twelve ounces of ground cloves, one pound of sugar, two ounces ground ginger, two ounces allspice, as much flour as will make a batter.

PIE—Apple.—Cut your apples in quarters, core them and put them down to stew with sugar and a little water, as also a half dozen cloves; ten minutes will stew them. Lay your crust on your pie-plate, get some dried orange-peel or preserved quince, cut it in little pieces and mix with the stewed apple, put this in the pie and cover it with a crust, having wet the corners all around, which makes the top crust adhere better to the bottom one.

PIE—Beefsteak.—Take cold roast beef, cut it into thin slices about an inch and a half long. Take raw potatoes, peel and cut them into slices. Have ready a deep dish, lay some of the potatoes at the bottom, then a layer of beef, and so on till the dish is filled. Season it as you would chicken-pie, fill it with boiling water, cover with a crust and bake.

PIE—A delicious.—For two pies take six eggs, one cup of butter, one cup of pulverized sugar, one teaspoonful of vanilla. Beat the yolks and sugar together till very light; beat the butter till creamy, and add it to the sugar and yolks. Make a puff-paste and line two deep tin pie-plates, then pour in the batter equally in each. Beat the whites of the eggs to a stiff froth, add to them one and a half teacups of fine white sugar, flavor with a little vanilla. After the pies are baked, spread over some of the frosting, and return to the oven and slightly brown. Just before sending to table, strew over the pies a couple of tablespoonfuls of coarse granulated sugar. This is a fine pie.

PIE—Cherry.—Lay your crust on a deep pie-plate or pudding dish, stone your cherries, put them in the pudding dish with a layer of sugar, then cherries, then sugar, and so on till the dish is filled; put on your crust, make an ornament of paste for the centre and bake it; be careful to use a deep dish, as cherries make so much juice they require no water.

PIE—Cocoanut.—Cut off the brown portion of the cocoanut, after which grate the white part, mix it with milk, place it on the fire, and let it boil slowly for about ten minutes. To one pound of grated cocoanut allow one quart of milk, eight eggs, four tablespoonfuls of sifted white sugar, a glass of wine, a small cracker grated fine, two spoonfuls of melted butter, and one-fourth of a nutmeg. Beat the eggs and sugar to a froth, then stir the wine in. Then put them in the milk and cocoanut, which must be cool; add the crackers and nutmeg, turn the whole in deep pie-plates, with a lining and rim of puff paste. Bake as soon as turned into the plates.

PIE—Chicken.—Take two full-grown chickens, or more if they are small, disjoint them and cut the back-bone, etc., as small as convenient. Boil them with a few slices of salt pork in water enough to cover them, let them boil quite tender, then take out the breast-bone. After they boil and the scum is taken off, put in a little onion cut very fine, not enough to taste distinctly, but just enough to flavor a little; rub some parsley very fine when dry, or cut fine when green—this gives a pleasant flavor. Season well with pepper and salt, and a few ounces of good fresh butter. When all is cooked well, have liquid enough to cover the chicken, then beat two eggs and stir in some sweet cream. Line a five-quart pan with a crust made like soda biscuit, only more shortening, put in the chicken and liquid, then cover with a crust the same as the lining. Bake till the crust is done, and you will have a good chicken pie.

PIE—Lemon Cream.—Juice and grated rind of one lemon, yolks of three eggs, five table-spoonfuls of sugar, a small lump of butter and three table-spoonfuls of flour.

PIE—Lemon.—One cup of sugar, yolks of two eggs, one-half cup of milk, one cup of water; stir well together, and place in a crust; when done beat the whites of the eggs, and add one tea-spoonful of extract of lemon; spread this over your pie, and sprinkle with sugar; bake to a delicate brown.

PIE—Mince.—Boil a piece of beef weighing six pounds, and a beef's tongue weighing six pounds, six hours. Then skin the tongue, chop it and the beef fine, add five pounds beef suet chopped fine, five pounds raisins stoned, three pounds dried currants, one and one-half pounds citron, four pounds brown sugar, one pint good molasses, one quart brandy, one quart

wine, or omit these and add in their place boiled cider; half a cup each of salt, cinnamon, allspice and cloves, three nutmegs and a table-spoonful of mace. Mix all well together, and let it stand over night. Mix apples stewed when you make the pies, as the meat keeps better without apples. Keep it in a stone jar. You should have about a third as much apple as you have of the mince meat for a batch of pies.

PIE—Mock mince.—One cup of raisins, one cup of syrup, one cup of sugar, three-fourths of a cup of vinegar, one teaspoonful of allspice, one teaspoonful of cinnamon, three cups of water. Boil all together, and when cool add three soda crackers rolled fine. This will make three pies.

PIE—Pork.—Cut a piece of the loin of pork into chops, remove the rind and bone, cut it into pieces, season well with pepper and salt, cover with puff paste, and bake the pie. When ready to be served, put in some cullis, with the essence of two onions mixed with a little mustard.

PIE—Potato.—Wash and peel six pounds of potatoes, cut them in slices, add gravy, and a little of the fat of beef or drippings. Season the whole with pepper and salt; cover with paste, and bake an hour and a half.

PIE—Pumpkin.—Choose the best pumpkins that can be found. Take out the seeds, cut the rind carefully away, and then cut the pumpkin into thin and narrow bits. Stew over a moderate fire in a little water, just enough to keep the mass from burning, until soft. Turn off the water, if any remains, and let the pumpkins steam over a slow fire about ten minutes. When sufficiently cooled, strain through a sieve. Sweeten the pumpkins with sugar and a little molasses. The sugar and eggs should be beaten together. The flavoring requires ginger, the grated rind of lemon or nutmeg, and salt. To one quart of pumpkin add one quart of milk and four eggs for ordinary richness. Heat the pumpkin scalding hot before putting it upon the crust to bake, otherwise the crust will be soaked. Bake in a very hot oven.

PIE—Resurrection.—Mince the cold meat finely, put into a stewpan with a small piece of butter, some stock, a dessert-spoonful of flour, pepper, salt, and the juice of a lemon; stir all over the fire till thoroughly hot through. Line a soup-plate with pastry, put in the mixture, cover with pastry, and bake. It is best eaten hot, but is also very good cold.

PIE—Rhubarb.—Take the rhubarb and string it, cut it in small pieces, line your deep dish, put in your rhubarb with every layer covered well with sugar and a little grated cinnamon, bake it till the rhubarb looks well cooked; this pie can be covered with a crust if you wish.

PIE—Squash.—Pare, take out the seeds, and stew the squash till very soft and dry. Strain or rub it through a sieve or colander. Mix this with

good sweet milk till it is as thick as batter; sweeten it with sugar. Allow five eggs to a quart of milk, beat the eggs well, add them to the squash, and season with rose-water, cinnamon, nutmeg, or whatever spices you like. Line a pie-plate with crust, fill and bake about an hour.

PONE—Bachelor's.—Three eggs well beaten; three half pints of milk; a piece of butter the size of an egg; a tablespoonful of strong yeast, and as much corn-meal as will make a batter as thick as for muffins. Scald half the meal with half the milk.

BAKING POWDER.—Six ounces of carbonate of soda, four ounces of tartaric acid, two ounces of sugar (very finely sifted,) one ounce of salt. All must be mixed very completely together, and after the flour has been made into dough (with water for bread, or milk for rolls,) add one teaspoonful of the powder to every pound of flour, and mix thoroughly. If the powder is to be kept, it must be put into open-mouthed, dry bottles, corked and kept in a dry place.

PUDDING—How to make quick.—Split a few crackers, lay the surface over with a few raisins, tie them closely in a cloth, and boil them fifteen minutes in milk and water. With a rich sauce it is elegant.

PUDDING—Apple.—Peel and core six very large apples, stew them in six tablespoonfuls of water, with the rind of a lemon; when soft beat them to a pulp, add six ounces of good brown sugar, six well-beaten eggs, a pint of rich cream, and a teaspoonful of lemon juice; line a dish with a puff paste, and when baked stick all over the top thin chips of candied citron and lemon-peel.

PUDDING—Cup plum.—Take one cup each of raisins, currants, flour, bread-crumbs, suet, and sugar; stone and cut the raisins, wash and dry the currants, chop the suet, and mix all the above ingredients together; then add two ounces of cut candied peel and citron, a little mixed spice, salt, and ginger, say half a teaspoonful of each; stir in four well-beaten eggs, and milk enough to make the mixture so that the spoon will stand upright in it; tie it loosely in a cloth, or put it in a mold; plunge it into boiling water, and boil for three and a half hours.

PUDDING—Birds-nest.—Pare about a dozen sweet apples, core them with an apple corer, or by driving through them the tube of a funnel, set them as close as they can stand in a deep pudding dish, fill the cores with sugar, pour in a little water, and bake soft. Make a custard of a scant quart of milk, five eggs, sugar, a little salt and three-quarters of a teaspoonful of vanilla. Fill up the apples again with sugar, pour over the custard and bake quickly.

PUDDING—Baked bread.—Four ounces of fine bread-crumbs; two ounces of butter; two ounces of white sugar; three eggs; the rind of a

lemon, one pint of cream, and half a pint of milk. Put the butter into a bowl with the sugar, and the grated rind of a lemon; add the bread-crumbs, the eggs, well beaten, and a few drops of almond flavor; then pour upon it the milk, boiling, then the cream; mix the whole together, and bake it in a buttered dish, in a moderate oven.

PUDDING—BANCROFT.—One tablespoonful melted butter, one cup sugar, one egg well beaten, one pint flour, two teaspoons cream tartar, one of soda, one cup sweet milk; beat well and bake thirty minutes.

PUDDING—BREAD-AND-BUTTER.—When dry bread is left, spread it with butter and pile up the slices in a pudding dish. Fill in with custard, and add a few raisins. Bake it enough to cook the custard.

PUDDING—BOSTON.—Take six ounces of fine flour, six ounces of fresh suet shred fine, six ounces of raisins stoned, a cup of molasses, a cup of milk. Mix well, put into a basin, tie a cloth over, and boil from three to four hours. Serve with sweet liquid sauce.

PUDDING—BEEFSTEAK.—Make into a very smooth paste a pound of flour, six ounces of butter, and a little salt, moistened with three whole eggs, and cold water. Line with this a tin mold, medium size, and put in it a pound and a half of tender steak cut up into small pieces, entirely free from skin, gristle, etc., and seasoned with half a teaspoonful of pepper and salt well mixed together. Pour in a very small cup of water, cover carefully with a crust, tie a floured cloth over, and boil gently three hours. Don't allow it to stop. It can be made richer by adding a few large oysters to the steak.

PUDDING—CREAM.—Six tablespoonfuls flour, one quart of milk, three eggs, one teacupful of sugar and salt; take a little of the milk and stir with the flour, to make a batter, and boil the balance. When the milk boils add the batter, and when sufficiently cooked, take it off and stir in the eggs, beaten, sift a part of the sugar in the pudding dish, then pour in the pudding, and put the rest of the sugar on top; flavor to taste, and cover tightly till cold.

PUDDING—CHANCELLOR'S.—Boil one and a half pints new milk with sufficient loaf-sugar to sweeten it, the peel of a fresh lemon, cut thinly, a small quantity of cinnamon, mace and cloves. Boil all these ingredients as for custard. Beat up nine eggs, omitting the whites of four, pour the boiling milk, etc., into these, stirring continually during the operation, then strain the whole through a hair-sieve, and let it stand till cold, then take a good-sized pudding mold; butter it well, and line it with sponge-cake, cut into thin slices (it will probably require four), pour the custard into the mold and tie it close. It will take an hour and a half to boil. It is an improvement, after buttering the mold, and before placing the sponge-cake, to arrange some

stoned rasins, slices of candied peel and nutmeg. Serve hot with wine sauce.

PUDDING—CRACKER.—Pour over your soda crackers a pint of boiling milk. When cool, mash well. Beat two eggs, add a tablespoonful of flour. Mix all together, boil for an hour. Eat with sauce.

PUDDING—CORN.—Grate the green corn from two dozen ears, then carefully scrape the cobs so as not to get the chaff off; put with the corn about a quart of cold milk, three eggs, two tablespoonfuls of sugar, one teaspoonful of salt; if not sweet enough, add more sugar; if too thick, more milk—the consistency depends on the state of the corn. Pour into buttered plates and bake. A delicious dish for tea.

PUDDING—CORN-STARCH.—Boil one quart of good milk, stir gradually into it five tablespoonfuls of corn-starch, mixed with milk; add salt to taste, and two tablespoonfuls of loaf sugar, and stir until cooked; when cooled, add lemon or vanilla, and pour it into the molds.

PUDDING—EXETER—Put in a proper-sized basin ten ounces of fine bread-crumbs, four ounces of sago, seven ounces of suet, chopped fine, six ounces of moist sugar, the peel of half a lemon grated, a quarter pint of rum, and four eggs; stir for a few minutes with a spoon; add three more eggs, four tablespoonfuls of clotted cream; mix well; it is then ready to fill the mold. Butter the mold well, put in a handful of bread-crumbs, shake the mold well till the greater part sticks to the butter, then throw out the remainder, and have ready six penny sponge cakes, two ounces of ratafias, and half a pound of either raspberry or strawberry jam; cover the bottom of the mold with a layer of ratafias, just cover them with a layer of the mixture, cut the spong-cake lengthwise, spread quickly each piece with some jam, put a layer in the mold, then a few ratafias, afterwards some of the mixture, and so on, until the mold is full, taking care that a layer of the mixture is on the top of the pudding. It will take forty minutes baking.

ANOTHER.—Put in a small stewpan three tablespoonfuls of currant jelly and two glasses of sherry; warm on the fire, and pour over the pudding cloth, and serve hot.

PUDDING—BAKED FLOUR.—Boil one quart of milk; when entirely cold, add it gradually to eight tablespoonfuls of flour, eight eggs, yolks and whites beaten separately, a little salt. Bake one hour.

PUDDING—HOTEL.—Heat one quart of milk to a boiling heat; add one-quarter of a cup of butter; then stir in six ounces of Indian meal, two eggs well beaten, three-quarters of a cup of molasses, one-quarter tablespoonful of cinnamon or ginger. Bake one hour. To be eaten with sauce of butter and sugar.

PUDDING—Indian huckleberry.—Stir into a quart of boiling milk enough meal to make a moderate stiff batter. Add a couple of beaten eggs, a little salt, a small cup of finely-chopped suet, a little molasses, and a quart of huckleberries. Boil two hours in a bag, leaving room to swell. Serve with rich liquid sauce.

PUDDING—Lemon.—Half pound of bread-crumbs, the rind of two large lemons, grated, one cup of sifted white sugar, two eggs, a pint of milk; mix well together, then add the juice of the lemon gradually; pour into a buttered basin, and boil one hour; serve with liquid sauce.

PUDDING—Plum.—One ounce of candied lemon-peel, one ounce of orange-peel, six ounces of raisins, six ounces of currants, six ounces of best beef suet, six ounces of sugar, six ounces of flour, two eggs, a pint of milk, a small nutmeg, and a teaspoonful of salt. Stone the raisins, pick, wash and dry the currants, chop the suet extremely fine; put them, with the lemon and orange-peel finely sliced, all together in your large dish for mixing; add the flour and sugar, and grate the nutmeg over all; then heat up your eggs and stir the milk gently into them. With this liquid wet all the other ingredients; flour well a strong pudding-cloth, and when you have thoroughly mixed your pudding materials, so that all is perfectly blended, and taking care not to make them too wet, or to leave them too dry, put your pudding into the cloth, tie it tightly, and boil in a large pot five or six hours, taking care that the water boils ere the pudding is put in, and that it is kept on a quick boil during the whole time of cooking, and also that the pot is replenished with boiling water, as it frequently requires to be.

PUDDING—Suet.—One cup chopped suet, one cup brown sugar, one cup molasses, one cup sweet milk, one cup each of rasins and English currants, one teaspoonful each of cinnamon, cloves, soda and salt, one small nutmeg, five cups flour; steam hard three hours. Serve with foam sauce, flavored with anything you wish. One-half of this recipe is enough for five persons. Warming over, by steaming, improves it, as it also does the bread.

PUDDINGS—Queen of.—One pint of bread-crumbs, pounded, one quart of milk, yolks of four eggs, half cup of sugar, and the grated rind of one lemon. For flavoring, take four tablespoonfuls of white sugar, whites of four eggs, and the juice of one lemon.

ROLLS—Breakfast.—One quart of flour, one pint milk, tablespoon butter, one tablespoon yeast. This is enough for a small family.

ROLLS—Cranberry.—Stew a quart of cranberries in just water enough to keep them from burning. Make very sweet, strain and cool. Make a paste, and when the cranberry is cold spread it on the paste about an inch thick. Roll it, tie it close in a flannel cloth, boil two hours and serve with

a sweet sauce. Stewed apples or other fruit may be used in the same way.

ROLLS—Graham, raised.—One cup of water, one tablespoonful lard or butter, a little salt, half cup yeast, half cup flour, and Graham flour to make a stiff batter. Let it rise over night, and in the morning add one egg, three tablespoonfuls molasses, half teaspoon soda, and one-third cup Indian meal. Beat thoroughly, put in the roll-pans to rise, and bake in quick oven.

MUSH—Graham.—Sift meal slowly into boiling, salted water, stirring briskly until as thick as can be stirred with one hand. Serve with milk, or cream and sugar, or butter, or syrup.

RUSKS.—Three-fourths of a pound of sugar, one-half pound of butter, one pint of sweet milk, five eggs, three and a half pounds of flour. Beat the eggs very light; put milk, sugar and butter together over the fire till the butter is melted; when cooled add half pint of yeast, then the eggs and flour. Mix quickly and set to rise. Mold by hand in round cakes, about half an inch in thickness. The cakes should be placed in the pan in a double layer, one cake on top of another.

GINGER SNAPS.—Mix four ounces of lard and four of butter, melted, with four ounces of brown sugar, a pint of molasses, two spoonfuls of ginger, and a quart of flour; strain in two teaspoonfuls of saleratus dissolved in a wine-glass of milk, adding sufficient flour for rolling out thin. Cut into small cakes, and bake in a slow oven.

SNOWBALLS.—Beat the whites of six eggs to a froth, sweeten them to your taste, and flavor them with rose-water. Drop them into a pot of boiling water, in tablespoonfuls, for a minute or two to harden them. Make a cream of milk, eggs and sugar to float them in.

SYLLABUS—Whip.—Mix a glass of brandy and half a pint of white wine with a pint of well-whipped cream, which sweeten with sifted loaf-sugar, and grate in lemon peel and nutmeg; serve in glasses, and set some of the whip on each.

TONGUE SANDWICHES.—Boil a good-sized smoked tongue four or five hours, not letting the water boil hard, but keep it on a simmer. Leave it in the pot until the water is cold; then skin it, and when ready to make the sandwiches, cut it as thin as wafers, using a sharp, thin-bladed knife. Rub a small quantity of mustard into a large slice of sweet butter, and cut slices of bread as thin as they can be shaved. Spread them with the prepared butter, and lay the slices of tongue between two slices of bread; then cut the slices in halves.

PUDDING—Rowley-powley.—Make a paste of one pint of white potatoes, strained and mashed; double the quantity of sifted flour, a tumblerful of butter, wet with sour milk, into which stir enough soda to sweeten

it. Roll it out a quarter of an inch thick, spread it with stewed cranberries, or any kind of preserved fruit, jelly or marmalade. Roll carefully, tie in a cloth and boil for two hours.

PUDDING—Rice, baked or boiled.—Wash in cold water and pick very clean six ounces of rice; boil it in one quart of milk, with a bit of cinnamon, very gently, till it is quite tender; it will take about an hour; be careful to stir it often. Take it from the fire, and pick out the cinnamon, and stir in a teacupful of sugar, half a cup of butter, three eggs well beaten, a little powdered nutmeg; stir it till it is quite smooth. You can line a a pie-dish with puff paste, or bake it in a buttered dish, which is better; three-quarters of an hour will bake it.

If you wish it more like custard, add one more egg and half a pint of milk.

If you boil it you can add whatever fruit you like; three ounces of currants, or rasins, or apples minced fine; it will take an hour to boil.

Serve with wine sauce or butter and sugar.

PUDDING—Sago.—Wash half a pound of sago in three or four waters; put it into one quart of milk. Boil these together until thick, stirring it carefully. Stir in, when hot, one-half pound of butter. When cold, add eight eggs, beaten well; four spoonfuls of wine and two of rose-water. Sweeten to your taste. Bake this in paste or not, as you like.

PUDDING—Tapioca.—Four tablespoonfuls of tapioca, one quart of milk, four eggs, saving out two of the whites for frosting; one tablespoonful of sugar; soak the tapioca over night, for several hours, in a little water; boil the milk and turn over the tapioca; and when it is blood-warm add the sugar and eggs well beaten; flavor the pudding with lemon or rose-water; bake it about an hour, and after it has cooled a little, add the two whites of the eggs, and one-half pound of white sugar, beaten together for frosting. This answers as sauce for the pudding, and looks quite ornamental.

TART—Apple.—Take some good baking apples, pare, core and cut them into small pieces; place them in a dish lined with puff paste, strew over pounded sugar, cinnamon, mace, nutmeg, cloves, and lemon-peel, chopped small; then add a layer of apples, then spice, and so on till the dish is full; pour a glass and a half of white wine over the whole, cover with puff paste, and bake it. When done, raise the crust, stir in two ounces of fresh butter, and two eggs well beaten, replace the crust, and serve either hot or cold.

TART—Grape.—Take a tart dish, line the bottom and sides with a paste, and bake it. If the dish has been well greased, the crust will turn out easily, of the same form. As this walled crust is simply intended to

hold and serve up the fruit, it need only be plain. Now make a syrup of half a pint of water and three-quarters of a pound of white sugar; bring it to a boil; have the grapes ready picked from the stalks and washed; then put them into the hot syrup for half a minute; allow all to cool in a bowl. When wanted, put the syrup and grapes into the crust-wall and serve.

TART—Currant.—Line a dish with puff paste, strew powdered sugar over the botton of it, then put in alternate layers of currants carefully picked, and sugar, till the dish is full, then cover and bake it. The addition of raspberries or mulberries to currant tart is a great improvement.

TART—Strawberry.—Put into a basin two quarts of the best scarlet strawberries, picked, add half a pint of cold clarified sugar, the same quantity of Maderia with the juice of two lemons; mix all well without breaking the strawberries, and put them into a puff paste previously baked; keep them very cool.

TART—Quince.—Take a few preserved quinces, put an equal weight of syrup, made with sugar and water and preserve, into a preserving pan; boil, skim, then put in the fruit; when somewhat clear, place the quinces in a tart-dish with puff paste as usual. Cover, bake it, and, when done, lift the top gently, put in the syrup, ice it, and serve.

TARTLETS—Hazelnuts.—Pound three ounces of hazelnuts well with a little water, and add three ounces of fine white sugar, and a little more water, and stir well together, whip the whites of three eggs to a stiff snow, and stir them into the nuts, with a tablespoonful of flour. There must previously be prepared little tins lined with "cake paste." Fill these with the mixture, and sprinkle with sugar, bake slowly, and ice with vanilla very carefully.

TARTLETS—Linz.—Beat one pound of butter to a froth, and add half a pound of sugar; three-quarters of a pound of pounded almonds; half a lemon, grated; one spoonful of powdered cinnamon; one pound of flour; stir all well together. Make round balls and press them into little round tins. Make a round hole in the middle, and fill with currant jam; then make a little roll of the dough, about the size of a thick cord, and put it on the top of the jam in the form of a coil; spread egg on the top and bake very quickly.

TRIFLE.—Place at the bottom of the trifle-dish a layer of macaroons and ratafiacakes, and pour over them as much sweet wine as they will absorb; squeeze the juice of a lemon, and add to it a pint of cream, not too thick; sweeten the cream with sugar rubbed on the rind; add a little brandy; whisk the mixture, and, as the froth rises, lay it on a sieve to drain, and if it is too thick, add to it a little water. When sufficient has

been drained for the purpose, make a custard with the remaining cream, and that which has drained from the froth; put it on a very slow fire, with two laurel leaves, and, when nearly boiling, take it off, and add the yolks of four eggs and the whites of two—the number necessary for a pint of custard—put it again on the fire, stirring slowly one way, till it thickens, but taking care not to allow it to come to a boil; cover the macaroons with raspberry or other jam, and pour on the custard, and when the custard is quite cold, put on the froth, sprinkling harlequin comforts on the top, and garnishing with different colored sweetmeats.

WAFFLES—Raised.—To make nice waffles, take one quart of wheat flour, and stir into it sufficient lukewarm milk to make a thick batter. Add a tablespoonful of melted butter, a teaspoonful of salt, half a cup of yeast, and two eggs, well beaten. Stir it altogether, and let it stand in a warm place till light (if the waffles are for tea, they should be made soon after breakfast.) Bake in waffle-irons well greased, and very hot. Turn the irons over once while baking, that the waffles may be browned on both sides. Bake until a nice brown—about five minutes.

WHEY—Lemon, to make.—Pour into boiling milk as much lemon juice as will make a small quantity quite clear; dilute with hot water to an agreeable smart acid, and put in a bit or two of sugar. This is less heating than if made of wine, and, if only to excite perspiration, answers as well.

YEAST—Mode of making.—The following mode, which is found very convenient in practice, was stated to us by a notable housewife. One quart of hops is boiled about three hours with about seven gallons of water; after that the resulting liquid is passed through a colander on three quarts of Indian meal, or so much that the mixture will be like batter. Half a teacup of salt is added, and when cooled to new milk warmth, half a pint of yeast. After stirring well, it stands 15 or 20 hours, and Indian meal added till of the consistency of dough, when cakes, three inches in diameter and half an inch thick, are made from it, and dried on a board by the fire; much heat will destroy the yeast, and if not dried in two or three days, fermentation will proceed so far as to destroy it. These cakes will be good for three months; one of them soaked half an hour in warm, not hot water, will be enough for a large loaf.

The yeast prepared by the Hungarians is similar, and will keep, it is said, a whole year. During the summer season, they boil a quantity of wheat bran and hops in water; the decoction is not long in fermenting, and when this has taken place, they throw in a sufficient portion of bran to form the whole into a thick paste, which they work into balls and dry by a slow heat.

YEAST—Potato and yeast cakes.—A correspondent of the *Country Gentleman* says:—"My wife makes a potato yeast which she considers superior to any other kind of yeast she has ever used, as it makes better bread, and is more convenient to use. It is made in the following manner: Take ten potatoes of large size, pare, wash and boil them; when done mash them fine, and pour on them one quart of boiling water, and stir in one coffee cup of dry sugar. After standing a few minutes, pour on a gill less than a quart of boiling water; when it is lukewarm add one pint of the same kind of yeast if you have it, or of good hop yeast, to raise it. Put it in a stone jar and cover it up tight to ferment, and set it in a warm place till the potato rises on the top, and light foaming spots burst from the surface; then put the yeast in a stone jug and cork it tight. It will be necessary to tie the cork in and keep it tied, to prevent it being thrown out. After the yeast is put up it should be kept in a cool place; when wanted for use, open the jug and stir up the yeast. One-half of a teacupful of it will make a large loaf of bread. In warm weather the yeast is better to make only one-half of the above quantity at a time, if but little used."

We find the following directions for making yeast cakes in the papers: Scald some flour with strong hop tea; when cool enough to bear your finger in it, set it to rise with good lively yeast; set at noon it ought to be light enough in the morning; stir in as much Indian meal as is required to mould it into a lump; cut it into thin slices on a board or tea-waiter, with a cloth spread over it, then set it in the wind to dry. It should be made in dry weather, or it may sour. Two-thirds of a teacupful will make a baking for an ordinary family. Soak fifteen minutes.

YEAST—To preserve.—Ordinary beer yeast may be kept fresh and fit for use for several months; by placing it in a close canvass bag, and gently squeezing out the moisture in a screw press, the remaining matter becomes as stiff as clay, in which state it must be preserved in close vessels.

YEAST—Milk.—One pint of new milk, one teaspoonful of fine salt, and a large spoonful of flour; stir these well together, set the mixture by the fire, and keep it just luke-warm; it will be fit for use in an hour. Twice the quantity of common yeast is necessary; it will not keep long. Bread made of this yeast dries very soon; but in summer it is sometimes convenient to make this kind when yeast is needed suddenly. Yeast should not be kept in a tin vessel. If you find the old yeast sour, and have not time to prepare new, put in saleratus, a teaspoonful to a pint of yeast.

USEFUL RECIPES—Kisses.—Beat with a wire whisk the whites of eight eggs to a stiff, solid froth, then stir gently in by degrees one pound of

the finest powdered sugar. If you desire to have them flavored add a few drops of lemon oil, or a teaspoonful of any extract you may fancy. Lay the mass out, in shape of small half-eggs, with a dessert spoon, on sheets of white paper, which must be laid on boards at least one inch thick—this is done in order that the kisses may receive no bottom heat. After they are so laid out, sieve fine sugar over the top, and then bake them in a moderate oven; a few minutes after they are taken from the oven remove them from the papers with a thin pallet knife, and join two of them together, thus forming the shape of a small egg. This mass may be laid out on papers as above described, by the aid of a canvass bag, fitted with a tin nozzle, into rings, shells, fingers, rosettes, etc., and with chopped almonds, filberts, or pistachio-nuts strewn over the tops, and then baked of a very light color.

Cream cake.—Put one and a half pints of water and a quarter pound of butter in a round-bottomed pan, place it upon the fire, and when it boils stir quickly in one pound of sifted flour, and stir it vigorously with a wooden spatula; now remove it from the fire, and beat in, one at a time, sufficient eggs to form a rather soft, smooth, sleek paste—eight or ten will be enough. With a spoon, lay out this mass in the form of round cakes or lumps, on greased baking tins, some distance apart, as they expand considerably. Bake in a hot oven. When cold, split them open at the side, and fill with a lemon or vanilla custard cream.

The Custard: Beat six eggs with half a pound pulverized sugar; add one pint of milk; flavor with vanilla extract; place it upon the fire and stir constantly until it thickens; then remove, and when cold fill your puffs.

Apples a la turque.—Pare and core a dozen good apples, put them into a basin with some thin syrup and the yellow rind of a lemon; cover them closely and simmer them gently until they are soft and clear. Take them out and lay them on a dish with wet white paper over them; this will prevent them from discoloring. Now cover a dish with puff paste; prick the bottom and bake it. When the paste is done, fill the holes made by the removal of the cores in the apples with raspberry jam, and arrange them on the paste in the shape of a cone. Beat the whites of six eggs to a stiff snow, and add to them six ounces of fine white sugar. Mix this gently in, then pile this meringue mass upon the apples. Sift some fine white sugar over it and set it in the mouth of the oven until baked a light brown color.

Mead or metheglin.—1. Take to each gallon of water three pounds of strained honey, boil these gently together for about one hour, add to it, while boiling, one half ounce of good sound hops, skim carefully, and drain the skimmings through a hair-sieve, returning what runs through; remove from the fire, and when the liquid is lukewarm stir into it a half pint of good staunch yeast; this quantity will serve for nine gallons of mead. Now, put

it into your cask and let it work over, filling it up until fermentation subsides. Paste strong paper over the bung-hole. This mead may be flavored with spices while boiling.

Mead is a very wholesome and pleasant beverage, very grateful in summer, and but little inferior to some of the white wines, and will keep for a very long time.

2. Take ten gallons of water, two gallons of honey, a handful of dried ginger root, and two lemons cut in slices, mix all together, and boil for half an hour, carefully skimming it all the time, and during the boiling add two ounces of hops; remove from the fire, and when the liquid is lukewarm add a strong yeast, and then cask, and allow it to work. In about three weeks after working off it will be ready for use.

Bread without yeast, or other ferment, is beyond my ken, unless it be in the form of biscuits or crackers.

These are compounded of flour, water or milk, and butter or lard. The unleavened bread of the Israelites is made of a dough composed simply of flour and water, rolled out thin and baked.

Doughnuts.—Make one pint of milk warm, melt in it a quarter of a pound of butter, four well-beaten eggs, and one pound of sugar. Stir the sugar into the eggs, grate in half a nutmeg, add half a gill of yeast, mix all together, and thicken it into a soft dough with sifted flour; now roll the dough, and form or cut out your doughnuts, place them on a floured board, and put them in a warm situation to rise. When they are light, fry them in boiling lard to a light brown color, drain them in a colander, and sift fine white sugar over them.

Crumpets.—Make two pounds of sifted flour into a dough, with warm milk and water, adding a little salt, three eggs well-beaten, and three tablespoonfuls of yeast; mix all well together, and reduce it with warm milk to the consistence of this batter. Set it in a warm situation to rise, and when sufficiently light pour it into buttered pans or tins, and bake slowly to a light brown color.

Glair of eggs is a brilliant glaze for pastry or cake; its preparation is simple. Whisk the whites of eggs to a froth, and let them stand for twenty-four hours, and then strain them through a muslin cloth.

Ratafia de framboises.—Bruised raspberries, eight pounds; proof spirit, two quarts; white sugar, one pound; mix and infuse in a corked demijohn for a week, occasionally shaking it, after which filter and bottle.

Ratafia de Cerises.—Select for this liquor a dark, rich, juicy cherry, of which take eight pounds, mash and bruise the kernels, cover all with one gallon proof spirit, and add two pounds white sugar dissolved in one quart of water. Put all into a close vessel, and digest for ten days, after which filter and bottle.

To color sugar sand.—Take a pound of white pulverized sugar, sift this in a lawn sieve in order to take out the finer portions. Put the coarser grains into a preserving pan, and gently warm it over the fire, stirring continually with the hand; pour in a sufficient vegetable liquid color to give the desired tint, and continue to work it about the pan until dry.

Raspberry and currant paste.—Take any desired quantity of red currants and raspberries in equal proportions, mash them together in a preserving pan, and boil them for ten minutes, stirring them with a wooden spatula; remove them from the fire, and when cool enough rub and press them through a hair sieve into a clean pan, and for every pound of pulp add one pound of pulverized white sugar; set this over a brisk fire, stirring constantly until the paste is sufficiently evaported to show the bottom of the pan as you draw your spatula across it; then remove it from the fire, and while it is yet warm lay out the paste in drops about the size of half dollars on sheets of white paper, laid upon coffers or sheets of tin. They should then be placed in the drying closet, and allowed to remain for several days or until they are dry. They may now be laid away in closed boxes, kept in a dry place, until wanted for use. This is a delicious paste, and when removed from the papers, and two of them interlarded with a fondant cream, and crystalized, makes a most beautiful and desirable winter bonbon.

To make skeleton leaves.—Place the leaves in a little rain water, to which a trace of yeast has been added. Allow the fermentation to proceed until the membranous portion becomes soft and easily washed away in a stream of water. They are bleached by dipping for a few minutes in a strong aqueous solution of sulphurous acid gas, or exposing them (while moist) in a box filled with the vapor of burning sulphur.

To preserve autumn leaves.—Spread the fresh leaves and press them in a suitable dish, with alternate layers of fine sand, which is thoroughly dry and as hot as the hand can bear. When the sand has cooled they may be removed, smoothed under a hot iron, dipped for a moment in clear French spirit varnish, and allowed to dry in the air. By many melted wax or parafine is preferred to the varnish. These latter must not be too hot.

Soluble blue.—Mix 1 pound of dry Prussian blue with a little hot water to form a paste, triturate this with about $1\frac{1}{2}$ ounces of potassium ferrocyanide (yellow Prussiate,) and allow it to dry.

Paste for scrap books.—Rice starch, 1 ounce; gelatin, 3 drachms; water $\frac{1}{2}$ pint; heat, with constant stirring, until the milky liquid becomes thick and glassy, when the paste is ready. Keep the paste in a tight bottle with a few drops of clove oil.

To render cloth fire-proof.—Steep the fabric in almost any saline

solution, such as borax, alum, sal-ammoniac, etc. The addition of about one ounce of alum or sal-ammoniac to the last water used to rinse a lady's dress, or set of bed furniture; or the addition of a less quantity to the starch used to stiffen them, renders them uninflammable, or at least so little combustible that they will not readily take fire, and if kindled, will not burst into flame.

WATERPROOFING CLOTH.—Cloth coated with linseed oil to which a little wax and litharge have been added, will be waterproof.

TO RENDER FABRICS WATERPROOF.—Saturate the goods with a strong hot aqueous solution of good resin soap, and then wring, transfer, and digest them in a second bath of alum or aluminum sulphate or acetate, dissolved in hot water. Rinse and dry thoroughly at a temperature of about 80 degrees Fah. Thus treated the fibers do not readily absorb water, but the goods are not absolutely waterproof.

MOTH AND ROACH EXTERMINATOR.—1. Benzine is said to be more effective than anything else for exterminating moths, roaches, etc. 2. A little alum or borax solution in hot water injected into the cracks and applied by a cloth to the wood work in the vicinity of these hiding places is usually effectual.

TO COLOR BUTTER.—Use a little annatto; if pure it is not injurious.

TO REMOVE STAINS FROM MARBLE.—Cover the soiled part with a paste of quicklime, moistened with a strong aqueous solution of sal-soda for several hours; then remove the paste, wash the parts thoroughly, and polish if necessary.

TO RELIEVE CASKS FROM MUSTINESS.—Burn a little sulphur in the empty casks, bung, and let them stand for a day.

STICKY FLY PAPER.—Boiled linseed oil and resin; melt and add honey. Soak the paper in a strong solution of alum and then dry before applying the above.

HOW TO SOFTEN HARD WATER.—Rain water contains a small amount of carbonic-acid gas, and when such water runs over limestone it dissolves and holds a small quantity of carbonate of lime, and becomes what we call "hard water." To convert it into soft water we must get rid of this carbonate of lime; and this may be done, in cisterns or reservoirs, by pouring in lime water, which by combining with the excess of carbonic acid causes all the lime to precipitate in the form of an insoluble carbonate, which falls to the bottom.

WELDING HORN.—Pieces of horn may be joined by heating the edges until they are quite soft, and pressing them together until they are cold.

TO STAIN HORN.—RED.—Soak in very dilute nitric acid for a few minutes, and apply a strong infusion of cochineal in aqua amonia.

GREEN.—Steep in a solution of 2 parts of verdigris and 1 of sal ammoniac.

BLUE.—Stain green, and then steep for a short time in a weak solution of sulphate of indigo, containing a little cream of tartar.

YELLOW.—Steep them in a solution of lead acetate, and, then, after drying, in a solution of bichromate of potash.

PURPLE.—Use a strong aqueous solution of gold chloride.

BLACK.—Use nitrate of silver solution and expose to sunlight.

BROWN.—Immerse in aqueous solution of potassium ferro cyanide dry, and treat with a hot dilute solution of copper sulphate.

WALNUT STAIN.—Water, one quart; sal soda, one-half ounce; Vandyke brown, two and one-half ounces; potassium bichromate, one-quarter to one-half ounce; boil for ten minutes, replacing water lost by evaporation. Use hot and allow the work to dry thoroughly before oiling or varnishing.

DYEING RECIPES—YELLOW CANNELLE.—For 100 pounds bleached cotton. Ten pounds catechu, four pounds blue vitriol, half pound bichromate. Pass first through the catechu, and wring; then pass through the bichromate, and wash. Repeat the passes, and wash. Finish with ten pounds quercitron bark.

CARMELITE OLIVE.—For 100 pounds bleached cotton. Fifteen pounds catechu, four pounds blue vitriol, one pound bichromate. Work same as for yellow cannelle, and finish with fifteen pounds quercitron and one tumbler of pyrolignite of iron.

TETE DE NEGRE.—For 100 pounds bleached cotton. Five pounds catechu, two pounds alum, one pound blue vitriol, two pounds bichromate. Work as in yellow cannelle. Finish with forty pounds red sanders and one tumbler of pyrolignite of iron for each twenty-five pounds cotton.

DARK CANNELLE.—For 100 pounds bleached cotton. Fifteen pounds catechu, six pounds blue vitriol, one pound bichromate. Work as in yellow cannelle, and finish in a boiling bath of four pounds sal-soda.

GOLD YELLOW ON LINEN (11 pounds.)—Steep for three hours in a boiling beck of seventeen and a quarter ounces tannin, and dye in a fresh cold beck with about three and a half ounces aniline orange, otherwise known as phosphine.

CHROME ORANGE ON LINEN (11 pounds.)—Boil up three and a quarter pounds sugar of lead in water, with an equal weight of litharge, till the sediment is white. Let settle and steep the yarn in the clear hot liquid for an hour; take out and take through a cold beck made up of seventeen and a quarter ounce's lime. Rinse slightly, and work in a cold beck of seventeen and a quarter ounces chromate of potash, and the same weight of sulphuric acid, for a quarter of an hour. Redden in a boiling beck with eight and

three-quarters ounces lime, working for three minutes, and rinsing. If a redder shade is required, top in a fresh cold water, with one-eighth ounce magenta.

ROSE ON LINEN (11 pounds.)—Work in a boiling hot beck of seven ounces tannin and three and a half ounces curd soap; add to the water the solution of three and a half ounces tin crystals, and dye with one-third to three-quarter ounce saffranine at 110 degrees Fahr.

CLARET ON COTTON YARNS (11 pounds.)—Make up a beck with seventeen and a quarter ounces prepared catechu, and work the prepared yarn in it for one hour. Wring, and steep for half an hour in a hot beck of six and a quarter ounces chromate of potash; take through cold water, and work for thirty minutes in a beck of three and a quarter pounds sumac at 190 degrees Fahr. Then dye in a cold beck with one and three-quarters ounces magenta; take out, add to the beck eight and three-quarters ounces alum and the decoction of two and a quarter pounds logwood. Enter again, work in the cold beck; lift, and add, according to shade, from one-third to one and three-fourths ounces chromate of potash; re-enter, and work. The color is now complete.

FAST BLACK ON WOOLEN YARN (11 pounds.)—Boil for one hour with four and a half ounces chromate of potash, and the same weight of prepared tartar, finely ground; rinse immediately, and let cool in the liquor, and dye with six and a half pounds logwood, adding a little fustic, according to shade, and seven ounces logwood. Boil for three quarters of an hour. After dyeing, drain, and take the yarns four times through the prepared beck; rinse, and then take three times through an old soda beck. Rinse when the dyeing is complete.

BILLIARD GREEN ON CLOTH (110 pounds.)—Dissolve in water sixteen pounds and six ounces alum, boil in it twenty-two pounds fustic, and add five pounds and seven ounces extract of indigo.

THE color most in favor at the present time is *caroubier*, which seems to combine the red-cardinal and yellow-brown. It is easily obtained on wool in a bath of fuchsine, with the addition of a very small quantity of aniline maroon, or by a mixture of *orchil* with *red wood*, and a little *fustic* added, it is easy to produce this shade.

Eosine is now being largely substituted for cochineal in the dyeing of wool. A beautiful bright scarlet may be obtained by using the following: To ten pounds of wool, three ounces of eosine and eight ounces of alum.

WEEDS AND HOW TO DESTROY THEM.

WILD MUSTARD OR CHARLOCK is an annual, and one that is very troublesome. Although each plant dies every year, yet the seeds retain their vitality a long time, and the consequences are that it is a difficult matter to extirpate it. A system of rotation, in which spring sown crops are not frequent, and weeding out by hand as soon as the yellow blossoms appear in the spring, are the best remedies.

FALSE-FLAX, an annual weed, introduced with flax seed, a very common weed with that crop. The remedy is to sow clean seed, and alternate flax with other crops.

Fig. 419. False Flax.

COCKLE, OR WHEAT COCKLE, is an annual, but becomes a biennial if sown late in the season. The flour will show its effect by being of a dark color. To expel it, sow only clean seed, pull up the small plants early in the spring, and again, if any have escaped or been overlooked, when in flower early in summer.

Fig. 420.—Cockle or wheat Cockle.

CHICKWEED.—Although an annual, its extreme hardiness causes it to grow and flower during winter. On damp soils it is often very troublesome. Underdraining ard frequent cultivation will exterminate it. Every one is familiar with this troublesome weed.

Fig. 421. Chickweed.

PURSLANE.—An annual weed, spreading over the surface, and in summer, especially in gardens, very troublesome, on account of its extreme tenacity of life, after the stem is cut off. Removing from the land, or burying is advisable after passing the hoe over the surface.

Fig. 422, Purslane.

RAG WEED OR BITTER WEED is annual

and finds its way into cultivated fields. Clean culture and rotation of crops are the best remedies we know of. This is one of the most troublesome weeds a farmer has to contend with, and every effort should be made to extirpate the same.

CLOT-BUR OR COCKLE-BUR is an annual, not a formidable weed, but yet one that frequently is quite troublesome—the worst feature being the burs adhering to the fleeces of sheep. It is easily exterminated by cultivation. The thorny clot-bur is a far worse plant, and can be found extensively in the Southern States, but the same means will exterminate it.

Fig. 424.—Clot-Bur or Cockle-Bur.

BUR-MARIGOLD, STICK-TIGHT, OR SPANISH NEEDLES.—This is not a formidable weed, and only can be found on neglected soil. It is strictly an annual. Good cultivation will extirpate it.

MAY WEED is an annual, usually enduring the winter, growing often abundantly along road-sides, and having a disagreeable odor. As it rarely gets possession of cultivated fields, it cannot be termed a pest.

MULLEIN.—A well-known biennial weed, very common in the pastures of slovenly farmers, along the borders of roads, etc. The plants are easily destroyed by cutting off with a hoe, or by pulling them up the second year when the soil is softened by heavy rains.

RED ROOT—PIGEON WEED, CROMWELL, STONE WEED, OR STEINKRAUT, the latter by many called "stink root." This is a very troublesome weed to the farmer, in fact we might easily say, that it is one of the worst that he has to contend with. It is an annual, but assumes the character of a biennial, and spreading only by seed, it is more difficult to exterminate than even the Canada thistle. It is the great enemy of the wheat crop, and if once it gets possession of the field, it will nearly run out the grain. A good plan for extirpating this troublesome weed is as follows: For the first wheat crop, plow the ground very deep, at least eight inches. This will throw the seed down beyond the reach of vegetating, and the wheat may be sown on the inverted surface, and escape one year. In the fall plow as deep as for the wheat, which will throw the seed again to the surface. Harrow well, and the seed will germinate. The next spring turn the weeds under with a gang plow, or cut them to pieces with a large steel-tooth cultivator, and sow oats, barley, spring wheat or peas, the latter is best. By way of rotation plow or harrow again in the fall, to start another crop

Fig. 425. Red Root.

of weeds, and plant corn, cultivating it thoroughly. The following spring plant clover or grass, and when wheat is again introduced in the rotation, but few weeds will be discovered, and those can be pulled out by the hand.

TORY WEED OR HOUND'S TONGUE, is a coarse plant, growing along roadsides about two feet high, bearing purple red flowers, the flat seed roughened all over with short barbed or hooked prickles, causing them to adhere to clothing, and to the hair and wool of animals It is biennial and extirpated the same way as burdock, mullein, etc.

Fig. 426. Tory Weed, or Hound's Tongue.

JAMESTOWN WEED, OR STINK WEED, is a coarse fœtid plant, growing on the roadside and waste places. It is an annual and easily destroyed.

LAMB'S QUARTERS, GOOSE FOOT OR PIG WEED.—An annual plant, one that every farmer is acquainted with, and which grows abundantly in gardens and other cultivated grounds. It is easily destroyed by the plow, hoe or cultivator, before it attains an inch or two in height, and none can go to seed.

GREEN AMARANTH, some times called Pig Weed, is a coarse annual weed and like lamb's quarters it finds its way into cultivated grounds. It is easily destroyed by the plow, hoe or cultivator.

Fig. 427. Green Amaranth.

CHESS, CHEAT OR BROWN GRASS.—This is undoubtedly one of the most troublesome weeds which infest the wheat fields of this country, and one that every farmer is fully acquainted with by sad experience. Many supposed for a long time that this weed was produced from degenerated wheat, but the fact that it belongs to another distinct germ from wheat, renders this impossible. The extermination of this troublesome weed is a simple matter—and the way is, sow none but perfectly clean seed, and it will gradually disappear from the fields.

Fig. 428. Chess

WILD CHAMOMILE OR LARGE MAY-WEED.—This is nearly allied to the May-weed, and distinguished from that by its darker green below and more heavy appearance above, by its more aromatic and less offensive

odor, and its more coarsely cut leaves, and by its far more pernicious character. After gaining possession of a field, it is a difficult matter to extirpate, but the best treatment is a rotation of crops, in which winter grain rarely occurs. It is an annual, but generally assumes the character of a biennial, especially in winter grain crops.

FOX-TAIL GRASS.—There are two species of this troublesome weed which are often to be found in abundance in corn-fields, and spread rapidly by seed. Every farmer is acquainted with this nuisance, and should as soon as possible eradicate it from his farm. This is easily done when they first make their appearance above the surface, and if never allowed to go to seed, soon disappear.

Fig. 430.—Fox-tail grass.

TALL CROWFOOT OR BUTTER-CUP, is a weed common in meadows and pastures. It is easily exterminated by good cultivation in connection with rotation of crops.

Fig. 431. John's Wort.

JOHN'S WORT is a well-known and very troublesome weed, and one that every farmer knows. In neglected pastures it gets ahead so far as to often greatly diminish or exclude the grass crop. Good cultivation and rotation is the best means we know of to exterminate it. Sheep, however, eat it when quite young, and by this means tend to keep it down.

PLANTAIN.—Every farmer knows this troublesome, though not formidable weed. They may be destroyed by cutting off the roots beneath the surface, or by rotation of crops and thorough culture.

POISON HEMLOCK.—This plant in many particulars resembles the water hemlock, but is a thicker and ranker grower, and can mostly be found by the roadsides. It is easily extirpated by mowing first before seeding, and by cutting up the roots.

Fig. 432. Poison Hemlock.

Fig. 433. Mallow.

MALLOW.—This is a weed somewhat troublesome in the gardens, but is not a very formidable one. It is too well known to need description. Cut up by the roots before seeding will destroy it.

POKE, OR POKE WEED is well known to every one. To exterminate it cut off with a hoe below the surface.

SHEPHERD'S PURSE is a well-known weed, frequent in waste places, and in neglected gardens, and easily extirpated by good culture.

Fig. 434.
Ox-Eye Daisy.

OX-EYE DAISY.—This is most certainly one of the very worst weeds that the farmer has to contend with. Every one knows it. The seed are so tenacious of life, that even after having passed through the stomach of an animal they will vegetate. The best mode to exterminate is thorough cultivation, and may be given as follows: Plow the sod thoroughly, plant corn, hoe and cultivate well once a week. Next year plow and sow in two crops of buckwheat, and the third year manure and plant corn again; then again two crops of buckwheat for two years more, when the daisies will have vanished, and the ground be left rich. This weed usually grows best in poor pastures, and should be exterminated.

SOUR DOCK, OR CURLED DOCK, is so well known that it is useless to give a description. It is a very troublesome customer, but one that is easily destroyed by pulling up the roots before the seeds are formed, while the ground is soft from recent rains. If too hard they may be cut off by a sharp, narrow tool.

SORRELL, OR SHEEP SORRELL.—This is a similar weed in many respects to the Sour Dock, but much smaller in every way. To exterminate it is a matter of considerable importance, and the best manner is to seed down very densely with clover and a small portion of timothy.

GARLIC, FIELD GARLIC, OR WILD GARLIC.—Overy one understands this customer. It is nearly allied to the onion, and in some places grows extensively in meadows and pastures. It is destroyed by rotation of crops and thorough cultivation.

NETTLE.—This is a troublesome weed to farmers, but yet if taken in in hand, is not a very formidable one. It can easily be exterminated by cultivation. It is in some portions of the country much more troublesome than in others, and the quicker a farmer gets rid of it the better.

Fig. 435.—Nettle.

SWEET FLAG, OR CALAMUS, is known by its strong aromatic character and odor, and often can be found in abundance in marshy lands, where it will exclude everything else. To eradicate it, the first thing to do is to drain the land, and then repeatedly plow with a steel mould-board and harrow, for two seasons. In case the land cannot be drained, the mass of plants may be cut into blocks with

sharp spades and thrown into heaps. When these heaps dry, remove the block of roots, and convert them into compost in layers with stable manure. Seed the cleaned land with red-top or timothy, if dry enough.

WATER HEMLOCK.—The stem and leaves, and the root especially, are deadly poison. It should be carefully exterminated.

THISTLE OR HORSE-THISTLE.—A coarse, rough biennial plant. It is easily exterminated by cutting off the root with a stiff hoe, below the surface. If done when in blossom, the root will not sprout again.

BURDOCK.—Known as a coarse, rank, bitter weed, with very large burs, which become entangled in the wool of sheep, hair of horses, cattle, and in clothing. It is a biennial and easily destroyed by cutting off the root a few inches below the surface, although in some cases it will take years to completely exterminate it.

Fig. 436. Canada Thistle.

CAT TAIL, FLAG, OR COOPER'S REED, is conspicuous for its long leaves, and grows in swampy places. To destroy them, underdrain the land, or cart on earth, or both if desired, and then seed with red-top; or if well-drained, with timothy.

CANADA THISTLE.—This is an enemy that every farmer fears, and many suppose that after once taking possession of a field, that it is impossible to eradicate it from the soil. But the best way to get the control of these nuisances, is to plow them under, and continue the plowing often enough to keep them well smothered. If well and deeply done, once a month will be sufficient.

TOAD FLAX, OR SNAP DRAGON, by some called "Butter and Eggs." This is a very troublesome customer, and a very pernicious weed. It is common in many places along the roadside, fences, and in pastures. Cattle will not only not eat it, but also will they not eat the grass that grows with it. Spreading in dense patches, it soon prevents the growth of other plants. The best mode to exterminate it is repeated plowing and harrowing.

Fig. 437. Toad Flat.

MILK WEED, OR SILK WEED, is well-known by the milky juice which flows out when the plant is cut or broken. The weed is very troublesome on account of its running roots. Like the Canada thistle, it may be destroyed by never allowing the roots to breathe through leaves. This may be done by repeatedly pulling out the young plants the moment they appear above ground, or by deep and repeated plowing, followed by hand-pulling.

HORSE NETTLE.—A very troublesome weed, and more so at the

South than at the North. The only way to destroy it is by hand-pulling and thorough cultivation.

COUCH-GRASS, QUITCH-GRASS, OR QUACK GRASS.—This grass, on account of its great tenacity of life, and its creeping roots, is one very difficult to destroy, and is besides one of the most troublesome and obstinate weeds that a farmer has got to contend with. The best mode of extermination is to select a time when the weather and soil are in the dryest state, and plow, harrow, and rake the roots into heaps, and when dry burn them. Repeat the operation until you are satisfied that you have destroyed them.

Fig. 438. Couch-grass, Quitch-grass, or Quack-grass.

Fig. 439. Poison Sumach.

POISON SUMACH AND POISON VINE.—This is not only a troublesome but a disagreeable weed to have on the farm. Some persons are poisoned by it, or even by coming near it, and blisters are formed on the skin, while others are in no manner affected by it. They should be exterminated by cutting up as fast as they appear.

BLACKBERRY OR WILD BLACKBERRY.—This well known shrub often takes possession of waste ground on the land of slow going farmers, or on newly cleared fields. Every farmer has seen this, and how to eradicate them is the question. Early in the spring, when the leaves and shoots are tender, sheep will eat and reduce them, especially if strewed with salt; and towards the close of summer mowing them near the ground, which checks their vigor. Plowing and planting with hoed crops enables the farmer to eradicate them, or sow buckwheat, or better still, corn fodder in thick drills, cultivating two or three times.

ELDER BUSH.—A very troublesome bush. The remedy recommended for blackberry bushes will destroy it. If the bushes are cut early in summer, and the brush burned upon the stubs, and then all the sprouts pulled up the moment they appear, the roots will soon perish. Some attempt to root them out by digging down deeply for the roots, but it is much easier to starve the roots to death by allowing no leaves to grow above ground.

ALDER.—This well-known shrub grows along the margins of streams and in swamps, needlessly occupying the ground. To destroy them, cut them closely during the last half of summer, for two or three seasons.

GRAFTING, BUDDING AND CUTTINGS.

PROPAGATION BY CUTTINGS is the simplest of all modes of multiplying or increasing a variety. It simply consists in the insertion of a shoot of one year's growth in the soil. Under many circumstances, or in open ground, this mode can be applied to only such species as readily throw out roots, such as the currant, gooseberry, quince, grape, etc. Cuttings from such fruit as the apple and pear can only be made to take roots by confining the moisture under glass while artificial heat is applied. We might here add that cuttings of such trees as have a large pith succeed best when taken off with a portion of the preceding year's wood, such as the gooseberry, currant, vine, fig, etc. With such shoots as are large and strong, the best success will result if cuttings are separated at the point between the one and two year's growth. When we use small side-shoots, they should be cut closely to the main stem, so that the *collar*, or enlarged portion of the wood at the base of the shoot will be secured. Also the cut, if possible, should be made immediately below a bud, as roots are the more readily thrown out.

Fig. 440.

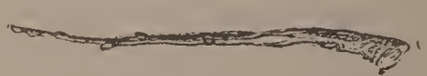


Fig. 441.

Autumn and winter is the best time to take off cuttings. If not taken off till spring the operation must be performed as early as possible. In ordinary cases the shoot, to prevent drying, should be buried about two-thirds or three-fourths beneath the surface, and it would still further increase their value by covering them, so that they retain their moisture, with manure, leaves or moss, or by placing them under the shade of a wall or close fence. Press the soil closely about them. If the cutting is long, like that of the grape, they should be placed sloping, so as not to be buried too deep or beyond the influence of the heat of the sun.

To procure young plants of the currant and gooseberry with straight, clean stems at the surface, and free from suckers, every bud should be removed, with the exception of a few at the upper end. The length may be from eight to twelve inches.

PROPAGATION BY LAYERS is another manner of reproducing. A

layer is a low side-shoot bent down and buried at the middle in the soil. The portion of the shoot that is buried strikes root, when it is taken off and planted separately. It has a great advantage over a cutting from the fact that while the roots are being formed it receives nourishment continually from the parent plant. Another important fact in favor of this plan is, that many plants which cannot be increased by cuttings, and even with great difficulty by budding and grafting, may yet be readily propagated by layers.

Such plants as the grape, from which roots are freely emitted, it is only necessary to simply bend the middle of the branch into the soil to insure success. But this will not always do, but in cases of difficulty, other plans are resorted to, one of the most common of which is to split a portion upwards, immediately under a bud (fig. 444) which enables the newly forming roots to pass freely and at once into the soil without the resistance of the thick bark which they otherwise must pierce. Many times the branch is cut partly off to intercept the downward passage of the fluids, and induce them to form into roots, at other times a wire ligature, or the removal of a narrow ring of bark, effects the same purpose. Burying the layers several inches under the surface is necessary, to keep it in moist earth; in case of drought, mulching is beneficial. A small hole in the ground is convenient, and in case the branch is stiff, it must be fastened down with a forked stick

Fig. 443. Layering.

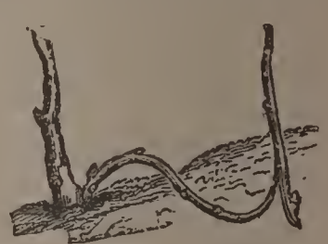


Fig. 444. Splitting Layering.

The best condition of a plant for layering purposes, is when the bark is somewhat soft and not too ripe, and on the other hand, the worst shoots are those which are stunted, and with a hard bark. But yet all shoots if not actually diseased, will root by layers, if sufficient time be given. Layers, like cuttings, may be made of the ripened wood in autumn or spring, or of the growing wood at or a little before mid-summer when the portion intended to root is somewhat mature and firm in texture. The apple, pear, or quince, if layered early in the spring, or the grape in summer, will be usually well-rooted in autumn. A moist season is the most favorable one to the rooting of layers, as it causes a softer bark on the same.

Besides the apple, pear, grape and quince, the layer plan is also extensively used for propagating many ornamental trees and shrubs. Suckers may be regarded as spontaneous layers, the new shoots being sent up from the buds or the roots, or portions of the stem beneath the surface of the ground. They are much employed in increasing most species of raspberry, while the runners of strawberries may be regarded as layers or suckers above ground.

PROPAGATION BY GRAFTING differs mainly and essentially from increasing by cuttings, as also by the layer system. There are several requisites to make grafting successful, the first being that the graft be so set in the stock, that the sap may flow upward without interruption; secondly, that the forming-wood may extend downwards uninterruptedly through the inner bark.

The first requisite is best attained by keeping a keen, flat bladed knife to cut the faces, and another knife for other purposes. Secondly, requires that the jaws of the stock, in cleft grafting, press with some force, but not too much against the wedge-shaped sides of the graft. A stock one-third of an inch in diameter will sometimes do this sufficiently; but three-quarters of an inch is a more convenient size. In *whip grafting*, the tongue and slit should be firmly crowded together. Thirdly, the requisite is attained by close examination with the eye, so that the line of division between the inner bark and the wood should coincide or exactly correspond in each. Fourthly, the wounded parts made by the operation be effectually excluded from the external air. This is accomplished by the application of grafting-clay. Grafting-wax may be made by melting together resin, tallow, and bees-wax in such proportions as to admit of being easily applied when softened by warmth, but not liable to melt and run in the heat of the sun. Another excellent grafting-wax is made of three parts resin, three of bees-wax and two of tallow. These ingredients, after being melted and mixed together, may be applied in different ways. The wax may be directly applied when just warm enough to run, by means of a brush; or it may be spread thickly with a brush over sheets of muslin, which are afterwards, during a cold day, cut up into plasters of convenient size for applying; or, the wax, after cold, may be worked up with wet hands, and drawn out into thin strips of ribbons, and wrapped closely around the inserted graft. To make the success more certain, the wax should be pressed closely so as to fit every part, and leave no crevices, so that the stock and graft be totally excluded from the external air. In cool weather, a lantern, chafing-dish, or hot brick, will be found necessary to soften the plasters before applying them.

The following figures represent the two most common methods of grafting fruit trees: Figs. 445, 446, 447 and 448 representing successive stages of *whip or tongue* grafting from the sloping cut of the scion and stock, to the completion of the operation by the covering with the wax plaster.

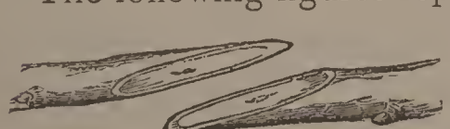


Fig. 445.

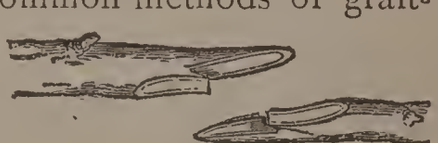


Fig. 446.

Fig. 447.

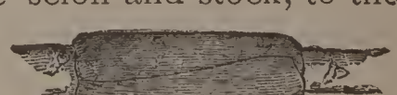


Fig. 448.

Whip-grafting may be employed for large stocks, as shown by the engraving, 449. In order that the line of separation between the bark and wood may agree in both, the graft must be placed at one side of the large stock, *a*, sloped and tongued for the reception of the graft *b*, their union being represented by *c*. To aid the wrapping of the wax plasters, one side and the upper point of the stock are pared off with a knife, before the two are joined, as shown by the dotted line. This is an excellent method of grafting any stock not over three-fourths of an inch in diameter.

Fig. 449.
Whip-grafting large stocks.

Fig. 450 shows a stock cut off for cleft grafting, with the upright cleft separated by an iron or steel wedge, ready for the graft. Fig. 451, the graft cut wedge form to fit it; and fig. 452, the graft is placed in its position, after the withdrawal of the wedge, the projecting angle of the stock sloped off with a knife, and the whole ready for the application of the grafting wax.

450. 451. 452.
Cleft-grafting.

Whip-grafting is more particularly applicable to small stocks, or where the graft and stock are nearly of the same size, and cleft-grafting to stocks considerably larger than the scion.

There are other methods of grafting which often are useful. In *saddle-grafting* the stock is sloped on each side, giving it the form of a wedge, fig. 453, *a;* the graft is split in the centre, and each side thinned away with the knife, as in fig. 453, *b*, until it will closely fit when placed like a saddle upon it, fig. 454. The best and most complete way to fit the graft, is to make a long sloping cut from the outer edge or bark, by drawing the blade from heel to point, till it reaches the middle of the graft, and then another similar cut completes the acute cavity for fitting the wedge of the stock. A sharp, broad and thin blade is needed for this operation. A wax plaster, drawn closely round the place of union, completes the work. In case the stock and graft are very nearly of a size, this is a good mode of grafting, as large corresponding surfaces are made to fit, and the graft receives freely the ascending sap.

Fig. 453.

Fig. 454.

We would remind the reader that in all these modes of grafting that whenever a wedge is made to enter a cleft, it should be thickest on the side where the fit is made between the two parts, so as to receive the full pressure of the cut faces at that side.

A modification of saddle grafting, very successful in its results, is thus performed; late in the spring, after the growth has commenced, the scion, which is much smaller than the stock, is split up, nearer to one side, more than half its length (fig. 454.) The stronger side is then sharpened into a wedge at its point, and introduced between the bark and the wood, a slight longitudinal slit being made through the bark of the stock that it may open slightly and admit the graft. The thinner division of the graft is fitted to the opposite sloping side of the stock. The whole is then covered with wax. The great length of that portion of the graft in contact with the bark and fresh wood, greatly facilitates their union; while the cut face of the stock is speedily covered with a new growth by that part of the graft which rests upon it.

In grafting the peach, which, from its large pith and spongy wood, scarcely ever succeeds as commonly performed, it is found advantageous, in selecting the grafts, to leave a quarter of an inch of the more compact two years' wood at the lower extremity.

Fig. 455. Saddle-grafting.

In grafting the plum and cherry, success is found to be much more certain when the work is performed very early in the spring, before the buds commence swelling, or even before the snow has disappeared from the earth. Apples and pears may be grafted later, and if the scions have been kept in good condition in a dormant state, they will generally grow if inserted even after the trees are in leaf.

After the insertion of the graft, and immediately after the tree commences growth, the buds on the stock must be rubbed off, so that the rising sap shall be thrown into the scion. In case large trees are grafted, it is only necessary to rub off the buds on the branch which holds the graft.

In case the sorts are rare, and the same have been grafted late in spring, and it is desirable to preserve them, a loose wrapper of white paper round the graft will protect it from the drying and scorching rays of the sun, or from shriveling, and failure will often be prevented by covering the whole graft with a wax plaster; or by encasing it in moss kept damp by occasional applications of water.

ROOT-GRAFTING is performed by taking up the stocks by the roots and inserting the grafts immediately into the part below ground after the tops are cut off, when they are again planted out, with the tip of the graft only above ground. This mode is successful with the apple, and occasionally with other trees, and is adopted on a large scale by nurserymen, the work being performed in winter or early spring within doors, and the grafted roots kept in cellars till the ground is ready to receive them.

The first operation is to cut up the grafts from the shoots or scions. It

Fig. 456.

is performed by holding the scion in the left hand, the thicker end pointing towards the right hand, which holds the knife. Such a shoot is represented, of diminished size, by fig. 456, the points, *a*, *a*, *a*, the place where it is cut into grafts, and the dotted lines show how the cuts are made. Fig. 457 shows a portion of the shoot the natural size; 1 the first cut nearly directly across; 2, the second or sloping cut, and 3, the slit for the tongue; and the whole finished and separate in fig. 458. Three strokes of the knife are thus required to cut and prepare each graft. Each shoot is thus cut up while yet held in the left hand, and the grafts, as fast as they are severed, drop into the cavity of the apron. The counting is done during the process of cutting, and at no other time.

Fig. 457.

Fig. 458.

The second operation is setting these grafts into the roots. Each root is held in the left hand precisely as the scion has been, fig. 459, the three cuts are given it (shown by the dotted lines in fig. 460,) to prepare it for the graft. The grafts having been placed directly under the operator's fingers, and in the right position, each one is successfully taken and firmly fitted to the prepared root, as shown in fig. 462, and as soon as this is done, another cut of the knife, three inches lower down the root, severs it, and the root-graft is finished, and drops off obliquely on the table. Another sloping cut on the same root, and a slit for the tongue, are quickly made, and another graft picked up and inserted, the root being all the time held in the left hand until worked up. A single root will sometimes make but one graft, but usually two or three and sometimes even more. Each part of the root should be about five inches long and the graft five inches.

Fig. 459.

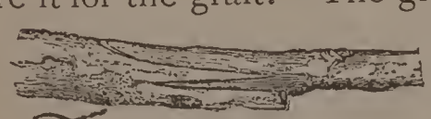


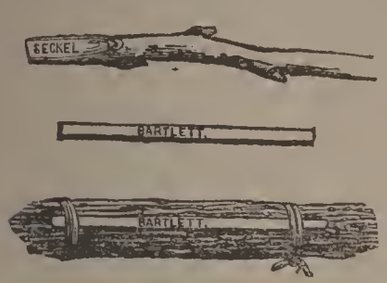
Fig. 460.

Fig. 462.

CUTTING GRAFTS.—Grafts are usually cut during the latter part of winter or early in spring; but if well kept they may be taken from the tree at any time between the cessation of growth in late summer or autumn, and the commencement of vegetation in spring.

They may be preserved out of doors safely, if buried in moderately moist earth, by placing the same in a box open downwards, and buried on a dry spot, the scions being kept from contact with the earth by sticks across the box. They may be conveniently preserved in a cellar in a box of damp

powdered moss, or in a moderately moist peat or black muck. Saw-dust answers the same purpose, if not in large quantities, so as to become heated. In cutting, the names may be kept temporarily, by writing with a common lead pencil on a shaved portion of the shoot, as seen in the cut, but in case you desire to pack away permanently, it is best to write the name on both sides of a piece of shingle, say about twelve inches long (see fig. 464,) and tie this up with the scions, as seen in fig. 465. By writing the name on both sides of the shingle, in case it gets erased from the outside, then the name on the inside will still be there to show what kind the shoots may be.

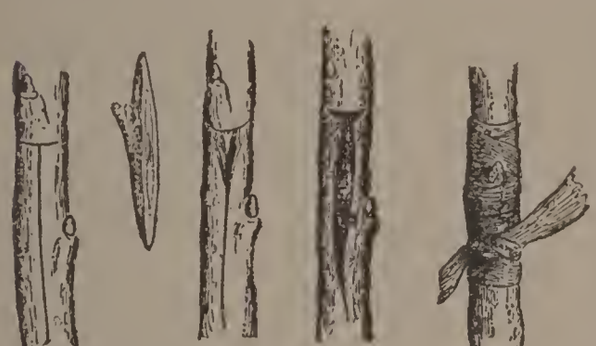


Figs. 463, 464, 465. Mark- and Packing Grafts.

Scions not fully hardy, as of most sorts of plums, should be cut early in winter, or before they have been exposed and injured by severe cold.

In case the grafts have become dry, they may be restored, if the moisture is applied so gradually that its absorption may require several weeks, by burying them as above stated.

PROPAGATION BY BUDDING consists in introducing the bud of one tree with a portion of bark and a small amount of adhering bark of another, and upon the face of the newly forming wood. The budding process must be performed while the stock is in state of vigorous growth. An incision is made lengthwise through the bark of the stock, and a small cut at right angles at the top, the whole somewhat resembling the letter T, fig. 466. A bud is then separated from the shoot of the present year's growth, by shaving off the bark an inch or inch and a half in length, with a small amount of wood directly beneath the bud. Fig. 467. The edges of the bark, at the incision in the stock, are then raised a little, fig. 468, and the bud pushed downwards under the bark. A bandage of bass, corn-husk, or other substance, is wrapped round, covering all the parts but the bud. The pressure should not be too hard, but only sufficient to keep the inserted portion closely to the stock, but being careful not to bruise or crush the bark, fig. 470.



Figs. 466. 467. 468. 469. 470. Successive stages of budding.

The time that the shoots containing the buds should be cut should be when they are so mature as to be rather firm and hard in texture, and usually they are in the best condition after the formation of the terminal bud.

To prevent writhering, the leaves of the shoot must be immediately cut off, leaving about one-quarter of an inch of the footstalks of the leaves, to

serve as handles to the buds while inserting them, fig. 471. After being thus stripped of leaves, they can safely be kept a week in a cool, damp place.

When, by growth of the stock, the bandage cuts into it, usually in ten days or more, the same must at once be removed. The bud remains dormant until the following spring, when the stock is cut off two inches or more above it, before the swelling of the bud. If cut closer, the end of the stock becomes too dry, and the bud often perishes. All other buds must be then removed, and all the vigor of the stock or branch thrown into the remaining bud, which immediately commences a rapid growth.

Fig. 471. Stick with bud

To secure a straight and erect tree, the new shoot when a few inches long, is tied to the remaining stump of the stock (fig. 472.) By another month, no further support will be required, and the stump may be wholly cut away, and the wounds permitted to heal by the rapid formation of new wood.

Fig. 472. Tying the young shoot.

Budding is performed in summer, grafting in spring, and both have their advantages. Budding is a simpler operation, and more successfully performed by a new beginner. Grafting requires less care subsequently, and may be conveniently employed as a remedy for failures in the previous summer's budding.

GRAFTS—Cutting.—Those who expect to use quantities of grafts in spring may find it most convenient to cut them in December, and not be compelled to perform it hurriedly, with perhaps the omission of what they most want, just before using. Very severe winters sometimes injure the shoots, or when apparently uninjured, their vigor of growth is lessened, and they do not start so readily. This may prove the turning point between the growing and dying of a graft. Plums and pears are more apt to be thus afflicted. By cutting them early in winter, all danger of this kind is avoided.

TERMINAL BUDDING.—In case buds are scarce, it sometimes happens that the terminal shoot may be used to advantage. In a case like this the wood is cut sloping downward, and the insertion is made as usual (fig. 472,) except that it becomes necessary to apply the whole of the ligature below the bud. The buds on small side-shoots which are not more than an inch or two long may be successfully used in this way, as the terminal eyes are stronger than any of the others. This practice may sometimes be adopted with advantage with

Fig. 473.—Terminal Budding.

the peach, where scions of feeble growth can only be obtained, as terminal buds usually escape the severity of winter when most of the others are destroyed.

ANNULAR BUDDING is applicable to trees of hard wood, or thick or rigid bark, as the walnut and magnolia. A ring of bark is removed from the stock; and another corresponding ring, containing the bud, slit open on one side, is made to fit the denuded space, fig. 474.

Fig. 474. Annular Budding.

PRUNING THE PLUM.—Nearly the same rule applies to pruning the plum as to the cherry; but a single shoot sometimes makes a long growth in a single season, an eye must be kept to them, and the necessary rubbing and pinching performed, that they do not outgrow the others.

PRUNING OLD TREES.—The mode of treating large trees has been already adverted to in the chapter on pruning. There are some owners of orchards who most erroneously suppose that when trees become old, heavy pruning will restore their vigor in the absence of good cultivation; while the correct mode of treatment is very moderate and gradual prunning, in connection with the best of cultivation. The annexed correct portraits of actually existing specimens of bad pruning, unhappily have too many originals over the country (fig. 475.) This most unsightly mode of trimming is often adopted when a removal of the top by grafting is intended.

Fig. 475.

PRUNING THE PEACH.—There is no tree that requires so much pruning as the peach. It is known by all that the young tree bears large, handsome and excellent fruit, while the old, enfeebled tree yields nothing but small specimens of inferior quality. Continued pruning will prevent this bad result. A good mode of pruning is to cut off two or three years' growth at a time from all the lower branches, taking care to leave a sufficiency of young wood, and always cutting back to a fork, so as not to make a dead stub.

Fig. 476.

Fig. 477.

In cases where the pruning has been neglected on young trees until they have attained several years of age, and the shoots have just begun to die out in the centre, a still more wholesale kind of pruning may be adopted. Three or four feet may be taken off, in cases of necessity, at a single stroke, and if judiciously performed, will convert the broad head which is beginning to become

enfeebled, into a smaller, neat, round and open head, possessing all the thriftiness of a young tree, and bearing as large and excellent fruit. Fig. 476 shows the tree before being thus cut back, and fig. 477 the same, with all the ends of the branches, shown by dotted lines, removed. It must be remembered here, as in other instances, that the outer shoots must be sufficiently thinned-back to admit light to the interior. The shearing, which is sometimes adopted, like that of a common hedge, only thickens the foliage on the outside, and increases instead of diminishing the evil.

SPRING BUDDING is successfully practiced as soon as trees are in leaf, the buds having been kept dormant by being placed in an ice house or a cool cellar. As soon as they have adhered, the stock is headed down, and a growth is made the same season. The peach, the nectarine, the apricot, and the mulberry, all difficult to propagate by grafting, may in this way be easily increased by budding. If the buds are kept in a cellar, it will be found important to preserve with them as uniform a degree of moisture as possible, and in as small a degree as will keep them from wilting.

PRUNING APPLE TREES.—We have given elsewhere directions in relation to forming a high or low top. On account of the crowded growth of nursery trees, they are likely to push upward to reach the light, at the expense of the side-branches. In addition to this influence, being closely trimmed on the sides to make them tall, such mismanaged trees assume the appearance of the annexed engraving. A better and superior shaped tree is shown in fig. 479. As all nursery trees succeed better and are more vigorous and surer to live, as well as handsomer in appearance when set out quite young, or at not more than two years from the bud or graft, the following directions apply to such trees at the time of planting, and immediately afterwards. Three or four side-shoots on the unformed tree, figs. 480 and 481, should be at first selected to form the main branches and to constitute the foundation or frame work of the future top. Two buds will be sufficient to grow on each of these shoots, making eight at the end of the season, taking care that all are distributed at equal distances. All the other shoots should be rubbed off with the thumb and finger as soon as they form. The second year the same process is repeated on the new shoots and continued until a handsome, even, symmetrical frame-work for the future head is obtained, after which comparatively little attention will be necessary. A large orchard of young trees may be managed in this way with a very few

Fig. 478. Nursery tree pruned too high.

Fig. 479. Well formed young tree.

480.

Fig. 481.

days' labor—far less than that afterward required in cutting out large limbs and giving shape to the distorted tops of full grown, neglected orchards. These rules will apply, substantially, to the pruning of standard pears, except that they generally require less thinning out.

Nearly the same course is to be pursued in forming the heads of dwarf apple trees, with the exception that the base of the head should be only about ten inches from the ground (fig. 482,) or if they be half-standards on Doucain stock, the heads should be about twenty inches or two feet high.

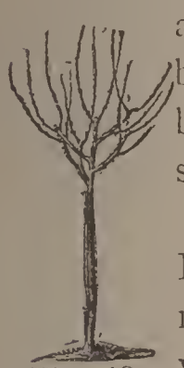


Fig. 482. Well-formed head.

Fig. 483. Dwarf apple.

PRUNING THE GOOSEBERRY AND CURRANT.—In the culture of the gooseberry and currant three distinct modes are adopted. The first, which is quite common in this country, is to plant the bushes along garden fences, where they often grow up with grass, and being neither cultivated nor cared for, the fruit becomes small and of little value. This is the worst mode.

The next is to cultivate, but not to prune. The fruit on such bushes is fine while they are young, but as they become filled with a profusion of old bearing wood it diminishes in size.

Fig. 484. Houghton seedlings.

The third and best mode is to give them good, clean cultivation, and to keep up a constant supply of young bearing wood, yielding large and excellent crops.

The currant and gooseberry, like the cherry, bear their fruit on shoots two or more years old; and it is important that a succession of strong young shoots be maintained for this purpose. The branches of the heads should therefore be distributed at equal distances, and the old bearing spurs cut out when they become too thick or enfeebled, and new shoots allowed successively to take their place.

When a young gooseberry or currant bush is set out, all the buds or suckers below the surface of the ground should be previously cut off clean so as to form a clear stem. It is often recommended that this stem be a foot high before branching—which does well for the moist climate of England; but under our hot suns it is better that the branches begin near the surface of the ground.

Old currant bushes, such as have grown up to a thick mass, may be greatly improved, and will increase the fruit several times in size, by thinning out clean all the old crooked wood, and leaving a sufficient number of young stems, at equal distances, to bear the future crop.

The English goosberry, in this country, will remain free from mildew only so long as it is kept in a vigorous growing condition by frequent and judicious pruning, so as to give a constant succession of strong shoots.

REGRAFTING LARGE PEAR TREES.—Before closing this chapter it may be well to give some directions for changing the tops of bearing pear trees. Some of the varieties described in the foregoing pages have already shown indications of becoming generally affected by cracking, and this disease may render a part of them worthless. In such cases it becomes desirable to regraft them with valuable sorts.

The old and common way is to cut off the trunk or a few of the larger limbs, and insert a few grafts, say four or five in all, and compel them to form the whole new head, requiring the lapse of many years. A much better and more expeditious mode is to scatter the grafts through the top—inserting so many that each one forming a small branch of itself, the whole taken together will make a full top in a few years.

In order to render the operation plain, fig. 486 is made to represent the unchanged tree at an age of from ten to twenty years. All the smaller branches are cut away, and those of medium size left distributed at as regular distances as may be. As the tendency of the growth is upwards, the top should be rather worked downwards in this operation and the side limbs near the bottom allowed a full chance. In the ends of all these shoots some thirty or forty grafts are set, as shown in fig. 487. Trees of the Virgalieu or Doyenne, which had become worthless by cracking, and which were large enough to bear a bushel or two annually, have been entirely changed in this way to better sorts, and yielding three years afterwards larger crops than ever.

Fig. 486.

Fig. 487.

Dwarf pear trees of undesirable varieties may be readily changed in this way to other sorts—the more easily because they are lower, accessible from the ground. Old dwarf trees which have become enfeebled by long bearing and spared pruning, may be thus rendered thrifty and vigorous. With large sized trees the safest plan to adopt is to change the upper half in one year, and the remainder for the purpose of avoiding too great a check in growth.

PRUNING DWARF PEARS.—Dwarf pear trees are usually pruned into the pyramidal and conical form, the latter differing only in its broader shape. The principle to be adopted in pruning has been already explained on a former page; the extent to which it must be carried, should be such as to keep the trees within ten or twelve feet in height, and six or seven feet in diameter at the base. A greater height increases the difficulty of pruning. The same reason forbids the adoption of a head with a clean stem below, as in common standards.

The pyramidal mode of pruning may be applied to pear trees upon pear

stocks. Dwarf trees may be planted from ten to twelve feet apart. They will always need careful attention to pruning, and to thorough and enriched cultivation of the ground.

In planting out the dwarf pear, the quince stock should be planted a little below the surface to elude the borer, which often attacks the quince, but rarely the pear. It is sometimes planted deeper for the purpose of causing the pear to throw out roots of itself, thus changing the dwarf to a standard. This practice is objectionable, as such roots are apt to be few or one-sided, inclining or prostrating the tree. It is also desirable to retain the bearing character of the dwarf.

When dwarfs become old, or begin to decline, pear roots may be given to them, and renewed vigor imparted by planting a small pear tree closely on each side, and when these become established, by inarching them into the tree, as shown in the annexed cuts. It is performed as follows:

Make a slit in the bark of the dwarf tree, a few inches above the ground and across the lower end of the slit make a cross-cut, so as to form an inverted ⊥. *A*, trunk of dwarf pear tree; *b*, *b*, pear stocks inserted into it, for new bottom; *c*, cut for receiving the pear stock; *d*, pear stock, cut sloping before insertion. If the tree is large, make a notch instead of the cut, sloping downwards, the better to admit the stock. Then bend the stock against this notch or cross-cut, and mark it at that point. Then with a knife set with the edge upwards at this mark, cut the stock off with a slope two or three inches long. It is then easily bent and inserted into the slit. It may be covered with grafting wax, but grafting clay is much better. This is made of clay or clay-loam one part, and horse manure two parts, well mixed together—the addition of a little hair is an improvement. Cow manure is entirely unfit, being too compact with the clay, and not possessing the fibrous character of the other.

Fig 488.

Fig. 489.

PRUNING THE CHERRY.—The cherry, usually, needs but little pruning, after the young tree has been properly formed. As wounds made in the winter are apt to form gum, and the removal of much foliage in summer injures the tree by checking its growth, the rubbing and pinching process should be exclusively resorted to, in forming an even and well-distributed head, nearly aftert he same manner as already described for the apples, the only care, as the trees become older, is to see that no shoots, by outgrowing the others, form a distorted top.

ROOT PRUNING.—This is sometimes done to check the growth of trees and produce fruitfulness—in the same way, but in less degree, that

transplanting produces a like result. It should usually be done early in spring, and with a spade ground sharp and kept solely for this purpose, so that the roots may be cut off smoothly, and not torn or bruised, as with a dull spade. Any required degree of check may be given to a tree by cutting the roots short or near the foot of the stem—a less check by allowing greater length.

GRAFTING NEW TOPS ON OLD TREES.—It often happens that fruit on large trees is worthless, and it becomes an important object to change the top by grafting or budding it with some better variety. In this case, instead of cutting off large branches and grafting them at once, it is better to prune the top in part, as shown by fig. 490, which will cause an emission of vigorous shoots. These are then budded or grafted with ease and success. And, as the grafts gradually extend by growth, the remainder of the top may, by successive excisions, be entirely removed. Where trees are not too old, and the ground is kept cultivated, good-sized trees are thus obtained much sooner than by setting out young ones.

Fig. 490.

To give a well shaped head to such newly formed trees, and to prevent the branches from shooting upwards in a close body near the centre of the tree, the old horizontal boughs should be allowed to extend to a distance in each direction, while the upright ones should be lopped.

PRUNING THE GRAPE.—The vines are trained on wire trellis, about eight feet high, supported mostly by chestnut posts, but some by locust. Since timber has become costly, the posts are placed about twenty feet apart; and the vines being about ten feet apart in the row, two occupy the spaces between the posts. Three wires are used, the upper being eight feet high, and the other two about two and a half feet apart, leaving a space of three feet next the ground.

This space is considered essential to the proper circulation of the air. A less height of the trellis was found to cramp unnaturally the growth of the Isabella vine; and by raising the trellis from six to nine feet, the product of the vine was doubled. A light stool ladder is used for gathering the upper branches.

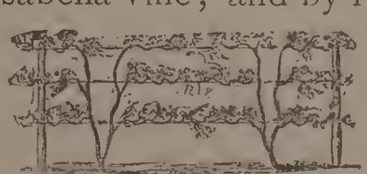


Fig. 491. Isabella Grape.

The mode of training—the result of many years' experience—is exhibited in the annexed sketch, fig. 491. The two upright branches of the vine are permanent, and remain as long as the vine lasts, unless accident or injury should require the removal and renewal of one of them. A horizontal cane is trained along each wire, and is commonly renewed every year, bearing shoots growing on last year's wood. These canes furnish the fruit-bearing shoots, which are commonly

thinned out so as to be from ten to fifteen inches apart. They are allowed to grow their full length, without being stopped, unless it be the first of autumn, and commonly attain a length of some three or four feet. The weight of the fruit ultimately gives them a drooping position. The space between the rows or trellises is commonly eight feet; on rich land a greater width is required, and on a poor soil less will answer.

PROPER TIME FOR PRUNING.—Many cultivators have been misled into the opinion that early summer is the best time to prune, from the fact that the wounds heal more readily. Pruning after the tree has commenced growth has a tendency in nearly every instance to check the vigor of the tree. For this reason, where the rapid formation of young wood is desired, the work must be performed before the buds begin to swell. Some planters have objected to shortening-in the shoots of newly-set trees, because by doing the work too late, or after the leaves were partially or wholly expanded, they have injured and not benefitted them. Any one may easily satisfy himself on this point by pruning back the heads of a dozen trees early in the season, and leaving those of another dozen until the leaves have opened. They will present the appearance represented in the annexed figures, before the close of summer—the first (fig. 492,) with strong, thrifty shoots; the latter (fig. 493,) with short, stunted growth.

Fig. 493.

Fig. 492.

There may be an exception to this general rule, where a slight amount of pruning in summer, not sufficient to produce any material check in growth, may be useful in improving the shape of the tree; such for example, as the removal of an occasional, unnecessary shoot or one-sided branch.

As fresh wounds always render trees more liable to be affected by intense cold, quite hardy trees only may be pruned any time during winter. On those inclining to be tender the operation should be deferred till towards spring.

MEASLES.—SYMPTOMS.—This disease commences with chills, succeeded by burning heat, listlessness, drowsiness, languor; rapid pulse; pain in the head, back and limbs; soreness of the throat; thirst, nausea, vomiting, dry cough and highly colored urine. These symptoms increase in violence for four days. On the third day the eyes become inflamed, cannot bear the light, and emit a profusion of tears. The nose discharges large quantities of watery substance, and sneezing is frequent. There will also be hoarseness and soreness of the breast. About the fourth day the skin becomes red and the eruption appears, accompanied by heat and itching. The eruption consists of numberless red points and pimples, collected into patches in the shape of a quarter or half moon. They generally appear first on the forehead and front of the neck, then on the cheeks and around the nose and mouth, after which they spread to all parts of the body. The color of the skin when the inflammation is at its height, is a bright raspberry red. About the eighth or tenth day a diarrhœa generally commences, showing that the inflammation of the mucous membrane is subsiding.—*Treatment.* If the disease be mild and regular, very little will be required, except mild diet, slightly acid drinks, with flax-seed tea, slippery-elm, or some equivalent, to quiet the cough. Frequent sponging with tepid water will moderate the fever and add to the comfort of the patient. If the eruption should "strike in," use a warm mustard bath. During the early stages of the disease the appearance of the eruption can be hastened by bathing the feet once or twice a day with hot water, and drinking freely of sweating drinks, as saffron, pennyroyal, balm, or mullein teas, and applying mustard drafts to the feet. If there should be a fixed pain in any part of the chest, which is made worse by coughing or drawing a long breath, it is evidence of inflammation in the chest, and it should be treated as pneumonia.

SCARLET FEVER.—SYMPTOMS.—This is an infectious and contagious disease, and manifests itself sometimes between the second and tenth days after exposure. It closely resembles measles in its symptoms, and is sometimes mistaken for that disease; but it can readily be distinguished from measles by the absence of a cough; by the eruption being finer and of a more

scarlet color; by the rash appearing several days earlier; and by the ulceration in the throat.—*Treatment.* In ordinary cases the treatment should be simple. Keep the room cool and the bed-covering light. Give cooling drinks, and sponge the body with cool water as often it becomes hot and dry. It may also be beneficial to give a few drops of the tincture of belladonna, night and morning.—In severe cases it is well to commence the treatment with an emetic, followed by bathing the hands and feet in hot water, with a little ground mustard or pulverized cayenne stirred in. This should be done twice a day, twenty minutes at a time, for two or three days. After the fever sets in, warm water alone may be used for the bath. If the head be affected, apply mustard to the feet, and prevent costiveness by using a very mild cathartic. No solid food should be given, but after the first shock of the disease has passed, cooling drinks will be beneficial, such as cold water, lemonade, rice water, etc. A good remedy is 45 drops of muriatic acid in a tumbler of water, sweetened, and given to a child in teaspoonful doses.—In very violent attacks, where typhoid symptoms manifest themselves, with great prostration, the eruption striking in, the skin changed to a purple or mahogony color, the tongue of a deep red, or with a dark-brown fur upon it, and the ulcers in the throat putrid, a *tonic* treatment must be adopted. In such cases a reliable physician should be called in at once. —Dropsical affections frequently follow scarlet fever, which can generally be controlled by giving a warm bath twice a week, and encouraging perspiration by the compound tincture of Virginia snake-root, or similar articles. Also giving a generous diet, to build up the system.

CHICKEN-POX—Swine-pox, horn-pox, hives, etc.—These all have a family likeness, and are so well-known that they need not be described. —*Treatment.* The same general treatment that would apply to a mild case of small-pox, or varioloid, will be sufficient.

VARIOLOID.—Symptoms.—The same as in small-pox, except milder. —*Treatment.* Sponge the skin frequently with cool water, give cooling drinks, and prevent constipation.

SMALL-POX.—Symptoms.—Languor, lassitude, shivering, pain in the head and loins; hot skin, quickened pulse and breathing; thirst, loss of appetite, furred tongue, nausea, vomiting, constipation and prostration. The tongue is white at first, but soon becomes red at the point and over the whole surface. The fever is highest during the night, and preceeds the eruption three or four days. The period between the exposure and the attack is from five or six to twenty days—short in severe cases and longer in the milder ones.—*Treatment.* But little is required, except confinement in bed, cooling drinks, cool and even temperature, frequent changes of linen, and sponging the body with cool water. When the eruption has

developed and the secondary fever commenced, a gentle laxative is needed to keep the bowels open, and opiates to relieve sleeplessness and nervous symptoms. If the eruption appears with difficulty, give the patient a warm bath, and administer Dover's powders. To prevent, pitting paint the face once or twice a day with glycerine.

ERYSIPELAS.—Symptoms.—Chilliness and shaking, succeeded by heat, lowness of spirits, pains in the back, limbs and head, quick, hard pulse, thirst, loss of appetite, white and coated tongue, bitterness of mouth, vomiting, pain in stomach, and costiveness. These general symptoms precede local inflammation several days. About the third or fourth day very minute blisters appear on the inflamed parts, filled with water, which increases until the blisters break and let it out. The disease reaches its climax on the eighth or nine day, when the blisters part and the skin begins to peel off. Sometimes matter forms under the skin, and occasionally mortification occurs. The seat of erysipelas is most frequently on the face, beginning on one side of the nose and soon spreading over that side of the face.—*Treatment.* Two things must be done—subdue the fever and the local inflammation. The former can be accomplished by rest, mild diet, gentle laxatives, and by the use of tincture of veratrum. For the local inflammation, first wash the inflamed part with soap and water, and wipe the skin dry; then moisten the inflamed and surrounding skin with warm water, and pass over it a stick of nitrate of silver, touching not only the inflamed part, but going an inch beyond it on all sides. A solution of nitrate of silver and nitric acid is preferred by some practitioners. A solution of coperas is also a good application. Bathe the inflamed skin occasionally with a tea made of buckwheat meal; keep the bowels gently open, feed the patient a milk diet and give from four to six ounces of port wine daily.

NETTLE RASH.—*Treatment.* First, give an emetic, followed by a brisk physic, after which give a few doses of quinine. Bathe the eruption with water and vinegar frequently, or a solution of corrosive sublimate. The diet should be simple and cooling, but avoid all stimulating food and condiments.

ROSE RASH.—*Treatment.* Light diet, acid drinks, and gentle laxatives.

HUMID TETTER.—Symptoms.—An eruption of minute, round pimples, about the size of a pin's head, filled with a colorless fluid, and terminating in scurf. When the blisters break, the water irritates and inflames the skin, which becomes red, rough and thickened.—*Treatment.* Low diet, cooling drinks, gentle purgatives, and warm baths. In chronic cases, apply externally, lime water, or corrosive sublimate in solution, or if the case be severe, a solution of nitrate of silver will be a good external application.

HERPES.—Symptoms.—After a slight feverish attack, lasting two or three days, clusters of small, transparent pimples, filled generally with a colorless fluid, but sometimes with a brownish lymph, appear on the cheeks or forehead, or on the extremities, and at times on the body. After a few days the vesicles break, and form brown or yellow crusts which fall off about the tenth, leaving the surface red and irritable. The eruption is attended with heat, itching, tingling, fever and restlessness, especially at night.—*Treatment.* Gentle laxatives and light diet. If the patient be-feeble, a mild tonic will be beneficial. Apply externally, white vitriol, or elder-flower ointment.

RINGWORM.—This disease is almost identical with Herpes, the only exception being that the inflamed patches assume the form of a ring.—*Treatment.* The same as in Herpes, with proper attention to the diet.—The following is also recommended: To one part sulphuric acid, add sixteen to twenty parts water. Use a brush and feather, and apply it to the parts night and morning. A few dressings will generally cure. If the solution is too strong and causes pain, dilute it with water, and if the irritation is excessive, rub on a little oil or other softening application, but always avoid the use of soap. Or, wash the head with soft soap every morning, and apply the following lotion every night. One-half drachm of subcarbonate of soda dissolved in one gill of vinegar.

ITCH.—*Treatment.* Wash the skin well with warm water and castile soap, then dry with a clean towel, after which rub well into the skin, while standing before a fire, four ounces of compound sulphur ointment. This should be done night and morning for three or four days, and the disease will disappear.—A solution of chloride of lime, used as a wash, will also generally effect a cure.—The following are also good remedies: Use plenty of castile soap and water, and then apply freely iodide of sulphur ointment, or take any given quantity of simple sulphur ointment and color it to a light brown or chocolate color with the subcarbonate of iron, and then perfume it. Apply this freely, and if the case should be a severe one, administer mild alteratives in conjunction with the outward application.—The sulphur bath is a good remedy for itch or any other kind of skin disease. Leprosy (the most obstinate of all,) has been completely cured by it, and the common itch only requires two or three applications to completely eradicate it from the system.—Benzine, it is said, will effect a complete cure for scabies in the course of half to three-quarters of an hour, after which the patient should take a warm bath from twenty to thirty minutes.

ITCH—Barber's.—Moisten the parts affected with saliva (spittle) and rub it over thoroughly three times a day with the ashes of a good Havana cigar. Also stop shaving. This is a simple remedy, but yet it has cured the most obstinate cases.

TETTER — CRUSTED. — Sometimes called Scald Head.—*Treatment.* Keep clean with castile soap and water. Remove the crusts with weak lye, made of hard-wood ashes, or potash; then apply an ointment made either of oxide of zinc, white precipitate, or diluted nitrate of mercury, after which cover the inflamed parts with oil skin. If the crusts are all on the head the hair should be first cropped off.—Or, take one pound of simple cerate; sulphuric acid, one-fourth pound; mix together, and it is ready for use.—Dissolve one-half ounce sulphuret of potash in one pint of cold soft water; put it in a bottle and tightly cork it. Bathe the eruption five or six, or even more times a day, with a sponge dipped in a little of this solution. If the tetter should again make its appearance in cold weather, repeat this treatment. This is a remedy highly recommended.

PIMPLES.—*Treatment.* Careful diet, avoiding butter and greasy substances, and using gentle cathartics. Apply externally, cold salt water with a sponge, and after drying, rub with pure glycerine.

WARTS.—Remove warts by binding a silk thread tightly around them, and allowing it to remain until they come off. Or if this is too severe, touch them daily with aqua fortis, or nitrate of silver.

CORNS.—The best remedy for corns and bunions is to wear loose shoes. Rub corns with manganic acid and they will quickly disappear. Or rub with glycerine until they are soft, and then scoop them out with the point of a knife.—The following corn plaster is a good remedy: Yellow wax, one pound; Venice turpentine, three ounces; verdigris (finely powdered), one ounce. Mix, with heat.

BUNIONS.—Bathe in warm water until soft, then apply a wash of sugar of lead. Do this every night before retiring, and the bunions will disappear.

CHILBLAINS.—Bathe the feet with a strong solution of alum, or a mixture of equal parts of oil of turpentine and balsam copaiva. Or, dip a piece of white chalk in vinegar, and frequently rub the chilblains with it. Or, bind on the thin white skin which comes from suet.

CHILBLAIN LOTION.—Dissolve one ounce of powdered sal ammoniac in one-half pint of vinegar, and apply to the affected parts.

RUSSIAN REMEDY.—A common remedy for chilblains among the peasants of Russia is the rind of perfectly ripe cucumbers, dried with the soft parts attached, and placed with the inner side, previously soaked in warm water, over the sore parts. Dumitriefsky confirms the efficacy of this remedy.

COLD FEET.—If you are troubled with cold feet at night, draw off your stockings just before undressing, and rub your ankles and feet well with your hand, as hard as you can bear the pressure, for five or ten minutes,

and you will never have to complain of cold feet in bed. It is hardly conceivable what a pleasurable glow this diffuses. Frequent washing of the feet, and rubbing them thoroughly dry with a clean linen cloth or flannel, is very useful.

FROST BITE.—To restore a frozen limb or foot, rub it with snow, or place it in cold water until the feeling begins to return, then gradually raise the temperature by pouring in a little warm water every few minutes. After the feeling has been restored, dissolve half a pound of alum in one gallon of hot water, or less quantities in proportion; and apply with hot cloths laid on the parts, keeping them wet with the wash.

FROZEN TO DEATH.—If a person become insensible from cold, and apparently frozen to death, take his clothes off and cover his body all over, except the mouth and nostrils, with snow. If snow cannot be obtained, put him in water as cold as ice, and let him lie for some minutes. Then rub him with cloths wet with cold water, until the muscles begin to relax. Then dry the body and place it in a cold bed, and rub only under the clothes with the warm hands. Continue this for hours, or until life begins to appear; then give a small injection of camphor and water, and put a drop of spirits of camphor on the tongue. After a little, rub with spirits and water, and finally with spirits alone, and give coffee, or brandy and water. Persons apparently dead can be restored by this treatment.

MOTHER'S MARKS.—These can be removed by penciling a small portion of the surface, from time to time, with nitric acid. But unless the mark is growing, or disfigures the face, it had better be let alone.

PERSPIRATION.—The health is greatly promoted by proper perspiration or sweating. Either too much or too little perspiration is an injury to the health, and if the flow be too copious it often becomes offensive. To remedy either extreme, bathe regularly and frequently in warm or cold baths, rub the skin well with coarse towels, use gentle tonics, and dress comfortably.

BRAIN FEVER.—*Treatment.* This should be energetic, and administered *early*. Shave the head and apply cloths wetted in water as cold as it can be made, changing the cloth frequently; or, put powdered ice in a flexible bladder, and lay it on the head, taking care not to make it too heavy. Leeches should also be applied to the neck and back of the ears, to remove the blood from the brain. Purge the bowels thoroughly and energetically, with calomal, croton oil, or compound powder of jalop. If there is collapse, great debility and tremors, coldness of the extremities, etc., give wine or other stimulants. See that the urine is evacuated every day. In the early stages of the disease, bathe the feet frequently in warm water, or mustard and water. Produce sweating and lower the pulse by giving tincture of veratrum in full doses—this must not be neglected.

DELIRIUM TREMENS.—*Treatment.* Give one-third of a grain of morphia; and if this does not quiet the patient, give thirty drops of laudanum every two hours, until he falls asleep. A draught or two of his accustomed drink, whatever it may be, will generally assist the action of the medicine.

DRUNKENNESS—CHAMBERS' REMEDY FOR.—Tartar emetic, eight grains; rosewater, four ounces. Mix. Put a tablespoonful into the whole quantity of liquor drunk each day by the patient, and let him take it as usual. Be careful not to exceed a tablespoonful or half an ounce

APOPLEXY.—This disease is that condition in which all the functions of animal life are suddenly stopped, except the pulse and the breathing; in which there is neither thought, nor feeling, nor voluntary motion; in which the person falls down suddenly and lies as if in a deep sleep. Persons liable to attacks of this disease generally have large heads, red faces, short and thick necks, and short, square build; though it occurs often among those who are thin, pale, and tall.—*Treatment.* Place the patient in a half recumbent posture, with the head raised; loosen his clothes, particularly those around the upper part of the chest, the shirt-collar and neck-cloth or whatever may press upon the neck; then as soon as possible apply cold, wet cloths to the head and face, changing them frequently. Ice will be better if it can be obtained. At the same time apply mustard to the feet, and draw tight ligatures around the limbs, to prevent the blood from returning rapidly in the veins. Remove the ligatures as soon as consciousness returns. The patient should be bled at the nape of the neck, if leaches are convenient or if there is any one present who understands cupping. Also administering a stimulating purgative injection, and place two drops of croton oil, mixed with a little pulverized loaf sugar, far back on the tongue. Repeat the injection every fifteen minutes, until the bowels are thoroughly moved. If the patient be old or feeble, the countenance pinched, and the skin bloodless and cool, the bleeding, purging, and applying of ligatures must be omitted. In such cases apply warm flannels and hot bricks to the surface, and administer ammonia and camphor internally.

APOPLEXY—TO PREVENT.—Keep the skin healthy by daily baths and friction. Prevent the bowels from becoming costive. Let the diet be light, chiefly vegetable, and almost entirely so in hot weather, and whatever is eaten should be well chewed. Keep the mind cheerful and hopeful and free from excitement. Restrain the sexual passions and indulge them very rarely. Eschew intoxicating drinks of all kinds, and discard tight shirt-collars and cravats. Avoid the rays of the sun in hot weather. Sleep on a mattress, with the head elevated, and eat nothing for three hours before retiring. Dip the feet in cold water at night before retiring, and it

any tendency to cold feet be experienced, sprinkle pulverized cayenne pepper in the bottom of the stockings.

SUN STROKE.—This is a complaint that all are liable to in hot weather, especially those who labor in the sun, and it is essential that every person should know how to prevent it, and what to do in case of an attack. —*Prevention.* Drink no spiritous liquors, and avoid highly seasoned food. Quench the thirst with temperate draughts of clear, cold water. Ice water is not injurious if you are accustomed to it, and do not drink too freely. Wear a hat that affords ventilation for the head, and in extremely hot weather keep a few green leaves in the crown of the hat—cabbage leaves are the best. Eat moderately, and do not go into the sun immediately after a hearty meal.—*Treatment.* In case of sunstroke, carry the patient immediately into the shade, and dash cold water over the head and upper part of the chest—ice water if it can be had soon enough; then employ about the same remedies as in apoplexy. The cold water or ice applications should be continued until consciousness returns.

In St. Louis, during the summer of 1878, when the great heat wave caused sunstrokes to become almost epidemic, about the only remedy employed was to pour a constant stream of ice water over the head and chest of the patient, and it proved effectual in nearly every case that was treated in time. It will not be out of place to state here, also, that nine-tenths of the cases of sunstroke at that time were among dissipated or drinking people, and at least one-half of them were beer drinkers only. So patent did this fact become that the business of the beer saloons suffered greatly during the continuance of the heat.

HYDROPHOBIA.—*Treatment.* As soon as possible after the wound has been inflicted, cut off the bitten part, or apply dry cupping, or suction. Also burn the wound with a hot iron or caustic. A lump of nitrate of silver, inserted in the wound, it is said, will kill the poison. It is no doubt worth trying, after the wound has been cupped or sucked. Quick and vigorous measures are required. It is also recommended to wash the wound thoroughly with warm vinegar and water, and after drying it pour in ten or twelve drops of muriatic acid. At this stage internal remedies are generally useless, though it is recommended by eminent practitioners to keep the patient, for a long time, under the influence of chloroform or ether. If the case is properly and vigorously treated at the beginning, before the poison has time to circulate into the system, there will be little danger of future attacks; but if the poison be not thoroughly eradicated it may subsequently manifest itself in the terrible disease known as hydrophobia. The interval between the bite and the appearance of the disease varies from twelve days to two months. The wound will heal over, and the patient imagine that he

is well and free from all danger; but after a while darting pains will begin to be felt in the scar, which, if it be a limb that was bitten, will run up towards the body. Sometimes the wound and the flesh adjacent to it will feel cold, or numb, or stiff; or the wound may become red, swollen, or livid, and occasionally break and discharge matter. The patient will feel a strange anxiety, accompanied by depressed spirits, occasional chills, disturbed sleep, and spasmodic twitches. The nervous system becomes disordered, trifling noises produce agitation; and the eyes are so disturbed by the light that the patient will sometimes hide himself in a dark place. Thirst begins to appear, but the moment he attempts to drink, a spasmodic shudder passes over him, and in an instant the fact of his awful condition flashes upon him. The remedy in this stage of the disease is red chickweed, or scarlet pimpernell. Four ounces of this plant, in the dried state, should be boiled in two quarts of strong beer or ale, until the liquid is reduced one-half. Then press out and strain, and add two drachms of laudanum. The dose for a grown person is a wine-glassful every morning for three mornings; or if the case is fully developed, the whole may be taken in a single day. The wound must also be bathed with the same decoction.

LOCK JAW.—*Treatment.* Chloroform and ether are the remedies for this disease, taken either into the stomach or by inhalation, in quantities sufficient to control the spasms, and continued as long as the spasms occur. Remove costiveness by giving one or two drops of croton oil, in a spoonful of gruel.

EPILEPTIC FITS.—Take of the root or comfrey, sassafras, burdock, elecampane and horse-radish, and of hoarhound and raspberry leaves, equal parts; make these into a strong tea, and to an adult administer one gill; to a child a proportionably less quantity per day. It is said that a black silk handkerchief thrown over the face of a person in a fit, will immediately bring him out of it. During the continuance of the fit, place a piece of leather or cork between the back teeth, to prevent the tongue from being bitten.

FITS.—Take of tincture of foxglove, ten drops at each time twice a day, and increase one drop at each time as long as the stomach will bear it, or it causes a nauseous feeling.

FIT, RAGING.—*a.* Beat onions to a pulp and apply them, as a poultice, to the back or to the groin. It gives speedy ease in the most racking pain. *b.* Apply heated parsley. When a child has a fit place it in a hot bath at once, and at the same time pour cold water on its head and face, or hold a sponge saturated with cold water, to its head.

SAINT VITUS'S DANCE.—This disease is principally confined to children and youths, before the age of purberty. The *causes* are various, excite-

ment, powerful emotion of the mind, overworking the brain, reading exciting novels, eating too much meat, fright, striking in of eruptions, self-pollution, etc.—*Treatment.* Remove all causes of excitement, take away all books; and regulate the diet, making it more stimulating if it has been too low, and more vegetable and cooling if it has been too high. The patient should also have cheerful out-door exercise every day. If this treatment be not sufficient, regulate the bowels with some gentle physic, for a few days. Build up the nervous system by giving three oxide of zinc pills every day—sulphate of zinc will sometimes succeed when the oxide fails. If there is scrofula in the system, give iodide of zinc. To these remedies add the shower-bath once a day, beginning with tepid water and making it a little colder every day. If the shower-bath frightens the patient, substitute the sponge-bath.

CRAMPS.—*Treatment.* If the attack occurs in the leg, tie a cord or handerchief tight around the leg above the affected muscle. If this fails to produce instant relief, rub the affected parts with spirits of camphor, paregoric, or laudanum. If the cramp occurs in the stomach, place a warm mustard plaster over the affected part; then take one-fourth of a grain of morphine, to be repeated in half an hour if it does not afford relief sooner. The bowels, if confined, should be opened with an injection.

NEURALGIA.—Acute attacks of this disease can be cured almost instantly by taking from one to four seeds of the common Jamestown weed (pronounced *Jimpson*,) gathered after the plant ripens. The writer has taken five seeds at a dose, and experienced relief in twenty minutes. Chronic cases of neuralgia may be cured by taking two or three doses per day, of one to three seeds each, for several weeks, at the same time regulating the diet and building up the system with iron tonics. The Jamestown weed and its seed are deadly poisons if taken in too large doses, and care must be exercised not to exceed the doses given above.

SICK-HEADACHE.—Much sick-headache is caused by overloading the stomach—by indigestion. It may be relieved by drinking freely of warm water, whether it produces vomiting or not. If the feet are cold, warm them or bathe them in water as hot as you can bear it. Soda or ashes in the water will do good. If the pain is very severe, apply a cloth wrung out of hot water, to the head, pack the head as it were. To prevent it, let plainness, simplicity, and temperance preside at your table. In some cases medicine is necessary, but if the above is carried out, almost immediate relief is experienced.

HICCOUGHS.—*Treatment.* Startle the person suffering by exciting surprise, fear or anger; or let a few small draughts of cold water be taken in quick succession, without breathing. If the stomach is sour, take a tea-

spoonful of bicarbonate of soda, dissolved in half a tumbler of cold water. If there is wind on the stomach, take a few drops of the essence of peppermint, ether, or compound spirits of lavender. The most effectual remedy for common hiccoughs, is to press heavily upon the collar bones with the hands.

SNEEZING—To prevent.—Rub the nose briskly between the thumb and forefinger.

FAINTING.—*Treatment.* Lay the patient on his back, with the head low; give him fresh air instantly, sprinkle a little cold water over the face, and hold spirits of camphor, ether, hartshorn, or vinegar to the nose; also rub a little spirits of camphor on the forehead and about the nostrils. As soon as the patient can swallow, give a teaspoonful of compound spirits of lavender, if convenient, with ten drops of water of ammonia in it. Persons subject to fainting should wear loose clothing, avoid crowded places, bathe daily in cold water, and regulate the diet. By so doing they may cure the habit.

VERTIGO—Dizziness of the head.—Ascertain the cause and remove it, and the dizziness will disappear. If dyspepsia be the cause, eat lightly; if costiveness, open the bowels by eating coarse food, or by gentle physics. Take plenty of exercise, avoid coffee, late suppers, and ardent spirits; keep the feet warm and the head cool.

NIGHTMARE.—Persons suffering from nightmare, so as to groan, scream, or call out, should be shaken, and they will instantly recover. To prevent this complaint, the diet should be simple and well-regulated, and plenty of out-door exercise should be taken. Avoid late, hearty suppers, and spend the evening in some agreeable amusement, so that the mind may be occupied with pleasant reflections upon retiring to rest. Persons subject to nightmare should not sleep upon the back, nor with the hands over the head.

CATARRH.—Take the bark of sassafras root, dry and pound it, use it as a snuff, taking two or three pinches a day.—Or, snuff the nitrate of silver powder, a pinch at a time, once a day. The latter remedy will generally cure the worst cases.

COLDS.—Take a large teaspoonful of flaxseed, with a quarter of an ounce of the extract of liquorice, and a quarter of a pound of sun rasins. Put it into two quarts of soft water, and let it simmer over a slow fire till it is reduced to one; then add to it a quarter of a pound of brown sugar candy, pounded; a tablespoonful of white wine vinegar or lemon-juice. *Note.*—The vinegar is best to be added only to that quantity you are going immediately to take; for if it be put into the whole, it is liable in a little while to grow flat. Drink a half pint on going to bed, and take a little

when the cough is troublesome. This recipe generally cures the worst of colds in two or three days, and, if taken in time, may be said to be almost an infallible remedy. It is a sovereign balsamic cordial for the lungs, without the opening qualities which engender fresh colds on going out. It has been known to cure colds that have almost been settled into consumption, in less than three weeks.

COUGH REMEDIES.—Dry the leaves of box-tree very well, and powder them small; and give the child of this fine powder, in its meat and drink, that it can be disguised in. It is excellent in that distemper

b. Common sweet cider, boiled down to one-half, makes an excellent syrup for colds or coughs for children, it is pleasant to the taste, and will keep for a year in a cool cellar. In recovering from an illness, the system has a craving for some pleasant drink. This is found in cider which is placed on the fire as soon as made, and allowed to come to a boil, then cooled, put in casks, and kept in a cool cellar.

c. The editor of the *Baltimore Farmer and Gardener* says, that the best remedy he ever tried in his family for a cough or cold, is a decoction of the leaves of a pine tree, sweetened with loaf-sugar, to be freely drunk warm when going to bed at night, and cold throughout the day.

The following is a pleasant and most excellent remedy for a severe cold: Take half a pint of good apple vinegar, two or three large slices of onions, a tablespoonful of butter, sweetened with honey or white sugar, and place it over the fire until it boils; then inhale the steam through the mouth and nose, and sip a little of the mixture with a spoon. The feet should be bathed in warm salt-water at the same time; then go to bed and cover up warm, and in nine cases out of ten you will have no cold next morning.

TONSILITIS.—Persons who have tonsilitis once are very apt to have it again, until the disease becomes chronic. There is no certain cure for it except to cut the tonsils off, and this must be done by a competent surgeon. The inflammation can sometimes be relieved by inhaling the steam from mullein leaves and hot water.

MUMPS.—In mild cases very little treatment is required. The face and neck should be kept warm, avoiding exposure to cold and damp, and warm infusions of balm, spearmint, or sage should be administered. It may be well to give four to six grains of Dover's powders occasionally; or the compound powder of jalap if there be costiveness. In severe cases physic must be freely used, with applications of leeches and cooling lotions or poultices. Sweating should also be induced by the compound tincture of Virginia snake-root, or by a vapor bath.

CROUP.—The characteristics of this scourge of childhood are so well known to every parent that it is useless to describe them. It is a disease

that generally attacks the patient in the night, and when the peculiar loud, and ringing cough, the sure indicator of its presence, is heard, no time is to be lost in giving relief to the little sufferer.—*Treatment.* Give an emetic, consisting of two drachms of wine of ipecac, or if that be not convenient, anything else that will produce sickness of the stomach and vomiting. This, however, must not be too severe. A flax-seed poultice, bound around the neck, is very beneficial. If the child be large enough, let it inhale frequently the vapor of hot water and mullein leaves. Move the bowels with a dose of castor oil; and if convenient, throw a strong solution of nitrate of silver into the throat with a shower syringe, until the membrane is discharged.—The writer has known dangerous cases of croup cured by simply laying a leaf of dampened tobacco on the breast of the child, and allowing it to remain until nausea and vomiting were produced.—The following is also said to be a quick and sure cure: Take a knife or grater, and shave or grate off in small particles about a teaspoonful of alum; mix it with about twice its quantity of sugar, to make it palatable, and administer as quick as possible. It is claimed that this remedy will relieve a child of the croup in one minute. It is simple, quickly prepared, and could be tried while preparing to administer other remedies.—Common cases of croup can be cured in a few minutes by swallowing half a tumblerful of strong salt water, either warm or cold.

HOARSENESS.—Make a strong tea of horse-radish and yellow dock roots, sweeten with honey and drink freely.

DIPHTHERIA.—Symptoms.—This disease generally begins with a slight stiffness or soreness of the neck, accompanied with a pricking sensation about the roots of the tongue. Generally, during the incipiency of the disease, there is slight drowsiness and chilliness, followed by feverishness, or headache and aching of the limbs. The glands at the angles of the lower jaw are apt to be slightly swollen and tender, and one or both of the tonsils are usually red and swollen. Swallowing, in some cases, is painful, but not always so. Cases having the above symptoms are not usually dangerous, and admit of successful treatment; but when an exudation having the appearance of white, gray, or ash-colored patches, begins to appear on or near the tonsils, serious danger may be apprehended. This exudation takes the form of fibrous matter, and soon hardens into a leathery membrane, which increases in size by additions to its under surface, until it obstructs the breathing and strangles the patient.—*Treatment.* Blisters, bleeding, purging, or anything that will reduce the system, must be rigidly avoided. The patient will need all the strength he can get. Bathe the inflamed parts with a strong solution of crystals of nitrate of silver, sixty to one hundred grains to an ounce of water. This can be done by fastening a soft sponge to the

end of a stick or piece of whalebone, and having dipped it into the solution, press the sponge gently upon the inflamed surface. Let this application be made about three times a day. Gargles may also be used to advantage, if the patient be old enough. The following is an excellent gargle for this purpose: Chlorinated soda, one ounce; muriatic tincture of iron, half an ounce; water, six ounces; use every half hour. The diet should be nourishing and easily digested—as beef-tea, chicken-broth, and eggs, with wine, new milk, cream, arrowroot, etc. When the patient has reached a convalescent state, beefsteak, lamb, chicken, etc., should be eaten moderately.—It is said that diphtheria can be cured by the simple use of lemon juice. Gargle the throat freely with it, at the same time swallowing a portion, so as to reach all the affected parts. A French physician claims that he saved his own life with this pleasant remedy. This no doubt would be beneficial in the milder forms of the disease.

DIPHTHERIA—SULPHUR FOR.—Mr. John S. Wiles, a surgeon of Thorncombe, Dorset, writes to the London *Times* that after two cases of malignant diphtheria out of some nine or ten he had been called to attend, had proved fatal, the mother of a sick child showed him an extract from an American paper concerning a practitioner who used sulphur to cure the disease. Accordingly he used milk of sulphur for infants and flour of sulphur for older children and adults, brought to a creamy consistence with glycerine; dose—a teaspoonful or more, according to age, three or four times a day, swallowed slowly, and application of the same to the nostrils with a sponge. Result: He did not lose a case there or elsewhere, and he succeeded in saving life when the affection had almost blocked the throat.

WHOOPING-COUGH.—*a*. Take of sweet oil, garlic, onions, each a gill; simmer together half an hour; then add a glass of honey, a teaspoonful of paregoric, and a teaspoonful of tincture of camphor. Dose, one teaspoonful three or four times a day.—*b*. Take of elecampane, four ounces; honey, half a pound; set it in a warm place until it forms a syrup. Dose, one teaspoonful three times a day.—A solution of nitric acid in water, sweetened until it is not quite so strong as lemon juice, and taken as a drink several times a day, is an excellent remedy.

RATTLES IN CHILDREN.—Administer a small teaspoonful of powdered bloodroot in molasses, and if this does not afford speedy relief, repeat the dose in half an hour.

PHTHISIC.—Take four ounces of hens' fat, and with it simmer a small quantity of the root of skunk cabbage. Dose, one teaspoonful three times a day.

ASTHMA.—The following remedies will greatly relieve asthma, but persons suffering from this serious complaint would do well to seek the advice

of some competent physician: Ether or tincture of lobelia, two ounces, tincture of assafœtida, one ounce; laudanum, one ounce; iodide of potassium, two ounces; simple syrup, four ounces. Mix and take a dessert-spoonful every two hours. Smoking stramonium leaves is recommended as a good remedy; and also burning paper, dipped in a strong solution of nitrate of potash, and inhaling the smoke.

BRONCHITIS.—Give warm flax-seed tea, or hot lemonade, at the same time soak the feet in hot water, and on retiring to bed, apply bottles of hot water to the feet and sides, to produce sweating. If there be costiveness, give a mild cathartic of rhubarb and magnesia, or salts and senna. If the case be severe, an active emetic should be administered, followed by full doses of tincture of veratrum veride. The atmosphere of the room should be kept warm and moist if there is difficulty in breathing. Control the cough by some simple cough syrup, such as recommended in whooping cough. The diet should consist of toast-water, rice-water, and a solution of gum arabic.

PLEURISY.—Symptoms.—This disease generally begins with shiverings, which are succeeded by high fever, with a peculiarly hard pulse; a sharp, stabbing pain in the side, generally just below the nipple, but sometimes extending to the shoulder, arm-pit and back; hurried and interrupted breathing, with great pain in attempting to take a long breath, and a short, dry cough.—*Treatment.* Give a teaspoonful of compound tincture of Virginia snake-root every half hour, to produce free perspiration. It may be given in infusion of catnip, balm, or pleurisy root; and at the same time a hot poultice of tansey or hops should be applied to the affected side. If this does not afford relief, give an emetic, and follow it with a physic, at the same time keeping up the perspiration with full doses of the tincture of veratrum. Dover's powders, in six grain doses, should be given to quiet the patient and produce sleep and perspiration at the same time. The diet must be very light.

PNEUMONIA.—Symptoms.—Pain in the side, difficulty in breathing, fever, dry cough at first, but soon accompanied by raising a thick, sticky, rusty-colored matter, composed of a mixture of phlegm and blood. As the disease progresses, this matter will become more tenacious, so that it will adhere to a vessel when turned upside down. There may also be some delirium.—*Treatment.* The treatment in this disease is similar to that in pleurisy. First give an emetic, and follow it with doses of compound tincture of Virginia snake-root, to cause sweating; apply mustard plasters to the chest, but do not let them blister, and bottles of hot water to the sides. If the fever be high, give ten or twelve drops of the tincture of veratrum veride every hour. Remove costiveness by moderate doses of salts, and give

slippery elm water, flax-seed tea, or lemonade, with a thin gruel of Indian meal or arrowroot. As the fever abates relieve the cough with some pleasant cough syrup, and allow the patient rest and quiet.

JAUNDICE.—*Treatment.* If the liver is inactive, begin with an emetic. An infusion of thoroughwort, drank freely every day, is an excellent remedy. A drink of composed of five drops of muriatic acid, and three drops of nitric acid, dissolved in a tumbler of water and sweetened so as to render it palatable, will assist very much in the cure. Sponge the body all over every day with alkaline water, and take a warm bath twice a week, rubbing the skin briskly with a coarse towel afterward. If there should be great pain from passage of gallstones, large doses of opium or laudanum must be administered, with application of mustard poultice over the seat of the pain. Relieve the acidity of the stomach by drinking at a single draught, a tumblerful of hot water, in which a large teaspoonful of bicarbonate of soda has been dissolved.

DYSPEPSIA.—The principal treatment for dyspepsia should be hygienic. Food should be eaten only in such quantities as the stomach can readily digest, no matter how small, and it must be well chewed. Nothing must be eaten that disagrees with the stomach in the slightest degree. The diet should consist almost entirely of bread made from unbolted wheat-flour, and boiled cracked wheat, with milk or molasses. This diet rigidly adhered to for a few months, with proper attention to keeping the bowels regular, and a proper amount of daily exercise, will cure the worst case of dyspepsia. The following recipes are also recommended for cases of long standing:

a. Take the bark of white poplar root, boil it thick, add a little spirit, and then lay it on the stomach.

b. Take wintergreen and black cherry-tree bark and yellow dock; put into two quarts of water; boil down to three pints; take two or three glasses a day

HEARTBURN.—A teaspoonful of soda, magnesia, or chalk, taken in a glass of cold water, will generally give immediate relief. Lime-water, or fluid magnesia will answer the same purpose. If there is wind on the stomach, with acidity, a teaspoonful of the aromatic spirit of ammonia, will give relief. Persons who are subject to the complaint should strengthen the stomach by the course of diet recommended in dyspepsia.

VOMITING.—This is generally cured by treating the disease which induces it, but it may be alleviated by any of the following remedies: Put a mustard plaster on the pit of the stomach, and swallow a teaspooful of good vinegar immediately after vomiting, and repeat the dose as often as the vomiting occurs. Pour boiling water on a piece of camphor, and take one dessert-spoonful every ten minutes until the vomiting ceases. Strong

coffee, with sugar or milk, will often act like a charm. A little brandy champagne, tincture of ginger, paregoric, or cherry-brandy, will often produce the desired result. The vomiting of children can often be arrested by wetting a cloth with laudanum and laying it on the pit of the stomach.

SEA-SICKNESS.—This complaint can be controlled, to a great extent, by the same remedies suggested for vomiting. But perhaps the best known remedy is chloroform, taken in doses of from forty to eighty drops, suspended in water by a little gum-arabic.

COLIC.—Common cases of colic may be relieved almost instantly by swallowing two or three tablespoonfuls of good whisky or brandy in a little hot water. With some persons a teaspoonful of tincture of ginger, in warm water, will do better. If these simple remedies do not bring relief, an emetic should be given, followed by a dose of salts, or castor oil, and a mustard plaster placed over the stomach.

COLIC, Bilious.—This is a dangerous disease, and requires energetic measures. It is characterized by violent paroxysmal pains, principally in the region of the navel, thirst and heat, and a discharge of bilious matter from the stomach. The head will be hot and the feet cold, while the whole body will be covered with cold sweat.—*Treatment.* Give an active purgative, consisting of two tablespoonfuls of equal parts of castor oil and spirits of turpentine. If that fails to act, give a drop of croton oil, done up in a crumb of bread. Cover the entire abdomen with a mustard plaster. A dose of camphor every fifteen minutes will aid in relieving the pain. Hot bricks, or bottles of hot water, should be placed at the feet and back, to promote perspiration.

COLIC, Painters'.—When this disease has become chronic, take, two or three times a day, a dose consisting of the following mixture: Fifteen grains of alum, two of aloes, two of jalap, and four of Dover's powders. If there is paralysis in the muscles of the arm, add one-sixteenth of a grain of strychnine to the above. Acute attacks of this disease should be treated with about the same remedies as those suggested for bilious colic.

COSTIVENESS.—Habitual costiveness may be increased by medicines, and they should not be resorted to except in the last extremity. The complaint can generally be cured by regulating the diet. Eat bread made from unbolted flour, cracked wheat, and fresh vegetables, such as peas, beans, potatoes, and squashes; also plenty of ripe fruit. Make an attempt to evacuate the bowels regularly every morning, just after breakfast; whether you succeed or not, the habit must not be abandoned—it will eventually result in good, and nine times out of ten will cure the worst cases of costiveness.

PILES.—Symptoms.—Usually there is a feeling of weight and weakness in the lower part of the back and loins, with a painful itching about the

anus. On going to stool, a burning, cutting pain is generally experienced. If it be bloody piles, the tumors will bleed at every motion of the bowels. The causes of this disease are numerous, such as habitual costiveness, straining at stools, riding much on horseback, sitting a great deal, tight lacing, highly seasoned food, etc.—*Treatment.* Costiveness must be prevented by some gentle cathartic, but active purging will do great mischief. The bowels should be regularly moved once a day, if possible, and for this purpose pills made of extract of thoroughwort are recommended. The food must be of a laxative nature, such as corn-bread, rye pudding, bread of unbolted wheat flour, buckwheat cakes, potatoes, broths, plenty of ripe fruit, and a little tender beef or mutton once a day. For local applications, use one of the following ointments: one handful each of switch hazel bark, white oak bark, and sweet-apple tree bark, boiled together in a pint of water until it is reduced two-thirds. Then strain and add two ounces of lard, and simmer away the water, stirring occasionally, before and after removing from the fire. Or, two ounces of lard and one drachm of flowers of sulphur, mixed and rubbed between two plates of lead until they are well blackened.

DIARRHŒA.—Take, every hour, until it operates, a tablespoonful of the compound syrup of rhubarb and potassa, with a little paregoric or essence of peppermint. If there should be nausea and vomiting, take a few drops laudanum, and put a mustard poultice on the stomach. Ten drops of laudanum will generally relieve griping, if there should be any.—The following recipes are excellent in this complaint: *a.* Take of opium, gum guaiacum, camphor, each one part; gum kino and ipecac, each half a part; mix into common-sized pills. Dose, from one to four per day; or, *b.* Take prepared chalk, two drachms; loaf sugar, one drachm; add one ounce of gum-arabic, eight ounces of water, oil of lavender, one drachm; laudanum, thirty drops. Shake it well when you use it. Dose, one tablespoonful every hour; oftener if necessary.—*c.* Take half a pint of brandy and stir it with an iron nearly red-hot, previously adding loaf-sugar enough to make it agreeably sweet. A spoonful or two to be taken two or three times a day.

DIARRHŒA, Chronic.—In this disease a sponge-bath must be taken daily, and the skin rubbed well afterward. Then take a teaspoonful of brandy, or blackberry brandy, in a little sweetened water, several times a day, and in the meantime let the diet be very light. One of the simplest and best remedies is to take no nourishment, for a long time, except milk with a little lime-water in it. In cases where there is great debility, quinine pills will be beneficial.

CHOLERA MORBUS.—*Symptoms.* Sickness and distress at the stomach, succeeded by violent gripings, vomiting and copious discharges from the

bowels. These discharges are a thin, whitish or greenish fluid. The nausea and pain are intense, and continue almost without intermission.—*Treatment.* First cleanse the stomach by giving large draughts of warm water. Then apply a mustard poultice over the stomach and liver, and give a tablespoonful of brandy or whisky, with fifteen drops of laudanum If the stomach does not retain it, repeat the dose in half an hour. Encourage the patient to resist the inclination to stool, and after each paroxysm of vomiting, let him rinse his mouth with vinegar, and swallow a little, to alleviate sickness of the stomach. Hot bricks or mustard applied to the feet will do much good. The following is also recommended: One grain of morphine and thirty of bicarbonate of soda, dissolved in an ounce of sweet tincture of rheubarb. Dose, a teaspoonful every half hour.

CHOLERA.—Symptoms.—Derangement of the digestive organs, rumbling in the bowels, pain in the loins or knees, twitching of the calves of the legs, thirst, and a slight diarrhœa. These are the premonitory symptoms, and are soon followed by vomiting, and purging a thin, colorless fluid, closely resembling rice-water; by severe cramps in the calves of the legs, which soon attack the bowels and stomach. The pulse becomes feeble, though sometimes full and hurried, the tongue is pale and moist, the breathing hurried, with distress about the heart, and the secretion of urine entirely stopped.—*Treatment.* Persons are apt to neglect the first stage of this terrible disease, and therein lies the greatest danger. When there is cholera in the vicinity, no diarrhœa, no matter how slight, should be permitted to go unhealed. Twenty drops of laudanum, repeated every three hours, will generally stop the diarrhœa. Morphine or opium are also suitable remedies. The patient should retire to bed and remain as quiet as possible, lying on his back. When vomiting, purging and cramps set in, energetic treatment must be resorted to at once. Let brandy be given freely, with twenty-five drops of laudanum, or large doses of morphine, which is better. The following is a good recipe for cholera: Camphor, 2 drachms; chloroform, 1 drachm, mixed well with the yolk of an egg; then add tincture of opium, 1 ounce; aromatic spirits of ammonia, 1 ounce; and give a teaspoonful every hour until relief is obtained. One-half grain of morphine, inserted under the skin of a patient suffering from cholera, will effect a cure when all other remedies fail. Syringes made for this purpose can be procured at any drug store. During treatment for cholera the surface of the body must be kept warm by constant friction, and the application of hot bricks, baths of hot water, mustard poultices, etc.

DYSENTERY, BLOODY FLUX.—Symptoms.—Loss of appetite, nausea, costiveness, shivering, hot skin, quick pulse; followed by an almost constant desire to stool, attended with griping pains in the bowels, which

extend apparently through the marrow of the bones along the legs to the knees. The evacuations are small, lumpy, and of a reddish color, consisting of mucous and blood. At first these discharges have but little odor, but as the disease advances they become very offensive.—*Treatment.* First, give a large draught of warm water, to produce vomiting and cleanse the stomach; then, every three hours, give a tablespoonful of equal parts of spirits of turpentine and castor oil, until a free action of the bowels is obtained. Three or four drops of laudanum should be added, to relieve the griping. A mustard plaster laid over the bowels will have a good effect. The object of the treatment in this disease is to secure the free action of the bowels, and astringents must therefore be avoided. The patient should lie on his back, and resist, as far as possible, the constant desire to stool. An injection of starch will often aid in producing a healthy action of the bowels; and the drink should consist of flax-seed or slippery elm tea, in moderate quantities.—In chronic dysentery the treatment must be principally dietetic, consisting of wheat flour porridge, boiled milk, boiled rice, etc., with a little tender beef once a day. In addition to this mild astringents will be necessary.

WORMS.—For a child one to two years old, give ten to twenty drops of the following mixture every three hours: Spirits of turpentine, half an ounce; castor oil, one ounce; worm-seed oil, one ounce. In two days give a brisk physic, and the worms will be expelled.—The following is a good preparation also: Pinkroot and senna, each half an ounce; bitartrate of potassa, one drachm; pulverized jalap, half a drachm; cardamon seeds, half a drachm; extract of liquorice, two drachms. Mix and add half a pint of boiling-water; let it steep half an hour, and give a tablespoonful or two at night, until the worms are expelled.

TAPE WORMS.—A sure remedy for tape worms is pumpkin seeds, bruised and steeped in water, and drank freely for several days. This will cure the worst case of tape worms.

SUPPRESSION OF URINE.—Place the patient in a warm bath for fifteen or twenty minutes, and then apply mustard plasters over the kidneys. The bowels should be opened by a dose of Epsom salts, compound powder of jalap, or castor oil. Ordinary cases of suppression of urine, in fevers, etc., can be cured by drinking freely of tea made of watermelon seed; flax-seed tea is good, also.

GRAVEL.—*a.* Make a strong tea of the low herb called heart's ease, and drink freely.—*b.* Make of Jacob's ladder a strong tea, and drink freely.

INABILITY TO HOLD THE URINE.—Children who suffer from this disorder should be restrained in their propensity to drink largely. They should also be required to make water just before retiring to bed, and

aroused again later in the night for the same purpose. The skin should be washed all over every day with cool water, and briskly rubbed with a coarse towel. Spirits of turpentine, given in small doses, will generally have a good effect.

DIABETES.—*a*. Take of loaf-sugar, resin and alum, equal parts, and take as much as the point of a pen-knife will contain three times a day.—*b*. Steep one ounce of ginger in one pint of good wine, and drink two or three glasses a day.

SYPHILIS.—This is an infectious disease, and is generally contracted during sexual intercourse with an infected person. But it may be contracted in many other ways, for the pus or matter of a syphilitic sore is as active and virulent as the germ of small-pox, and will reproduce the disease whenever introduced into the blood of a healthy person. It is frequently contracted by visiting public water closets, or drinking at public fountains; and it has even been communicated by a kiss. A scratch from the finger-nail of an infected person may introduce the poison into the system of a healthy one, and the disease is often contracted by sleeping in the same bed with a person suffering from it in some one of its various forms. No disease that humanity is heir to is more terrible in its effects than this, and considering the many ways in which it may accidently be communicated to a perfectly innocent person, every one should know what to do in case of an attack.—*Treatment.* If the treatment is begun in time, the disease can nearly always be arrested without difficulty. The first indication of its presence is a small, elevated, itching ulcer or ulcers, at the point of contact with the infectious matter, and as the disease is nearly always contracted during illicit intercourse, these ulcers usually appear on the private parts. As soon as the ulcers appear they must be burnt out, root and branch, with caustic. For this purpose caustic potassa, potassa with lime, or painless caustic may be used, and as soon as the desired object is accomplished, the wound should be bathed in vinegar and water, to neutralize the caustic. The surest remedy is to burn the ulcers out with a hot iron, but this should never be attempted by the patient himself, nor any but an experienced surgeon, for it might result in great bodily injury and accomplish no good. After the sore has been cauterized, a piece of lint, dipped in a solution of one drachm of opium to four ounces of water, should be laid upon it, and the entire infected surface covered with another piece of lint soaked in tepid water, and that covered with oiled silk, to exclude the air. This opium dressing must be repeated night and morning, until the sores heal. For internal treatment, take two pills, night and morning, of the following mixture: One-half drachm compound extract of colocynth; blue pill, eight grains; mix and divide into eight pills; followed by a tablespoonful of two

ounces Epsom salts, one grain tartar emetic, and one pint spearmint water, well mixed. This treatment, continued three or four days, will usually effect a cure; but if it does not, the patient should at once consult a competent physician, and be governed by his instructions.

GONORRHŒA.—Mix fifteen grains each of acetate of lead and sulphate of zinc, with six and a half ounces of rose-water, and inject into the urethra, three times a day, with a glass syringe. At the same time use internally, tincture veratrum, twenty drops; gelseminum, one ounce; water, four ounces. Dose, a teaspoonful every two hours. The following injection should be used once or twice a day after the disease has begun to pass away: Carbolic acid, ten grains; tannic acid, fifteen grains; water, four ounces.

SELF-POLLUTION, OR MASTURBATION.—This is a vice that prevails extensively among young persons of both sexes, and when persisted in, it always leads to serious results, such as nervous disorders, hysterics, consumption, insanity, etc. Parents should warn their children against its terrible effects, and their advice and counsel will generally be sufficient to prevent the vile habit. When once acquired, it can be broken up like any other bad habit, by a little exercise of the will. Medicines are not needed, but persons addicted to the habit must be warned of its evil effects, and persuaded to abandon it.

HYSTERICS.—The nervous spasms of hysterics can be stopped by pouring cold water on the head, face, or limbs of the patient. The general treatment of the complaint is very simple, consisting of plain, wholesome diet, bathing, exercise and the cultivation of self-reliant habits. The disease can be controlled, to a great extent, by force of will, and persons subject to it should school themselves in the art of self-government.

HYSTERICS.—Take the leaves of motherwort and thoroughwort, and the bark of poplar root, equal parts, mix them in molasses, and take four of them when the first symptoms of the disorder are felt, and they will effectually check it.

FALLING OF THE WOMB.—Simple injections of cold water into the front passage of the womb, alternated occasionally with an infusion of white oak bark, will generally effect a cure in this disorder. But if it is of long standing, the womb will have to be put back in its place, and sustained there by mechanical means, until the muscles and ligaments recover their strength sufficiently to hold it.

PAINFUL MENSTRUATION.—In cases of painful menstruation, twenty drops of laudanum, in a wine-glassful of tepid water, injected into the bowels, will usually relieve the pain. The neck of the womb should also be rubbed with an ointment composed of one-half drachm extract bel-

ladonna, mixed with half an ounce of lard. In cases where the membrane is thrown off in lumps or fragments, accompanied by great pain, take two teaspoonfuls of liquid acetate of ammonia in a teaspoonful of cold water, three or four times a day, while the pain lasts.

NIPPLES—SORE.—Spread a plaster of fir balsam, and apply it to the breast after the child has nursed.

THRUSH IN CHILDREN.—TREATMENT.—Wash the mouth with slippery elm water several times a day; or, if the case be severe, put a little pulverized borax, mixed with white sugar or honey, on the child's tongue three or four times a day.

TEETHING OF CHILDREN.—Nature induces children, when teething, to seek some hard substance to press the gums upon, to aid the teeth in pushing through. In addition to furnishing them some little plaything to bite, the gums should be lanced as soon as they are swollen by the teeth pushing them up. This will often prevent serious and even fatal diseases of the brain and nervous system, and greatly relieve the pain of the little sufferer. If there be suppression of the urine, give the child two or three tablespoonfuls of strong watermelon seed tea, every two hours, until the kidneys act.

SUMMER COMPLAINT OF CHILDREN.—SYMPTOMS.—Profuse diarrhœa, the stools being thin and light colored, or sometimes green or yellow; the stomach becomes irritable, rejecting everything with violence, and in some cases there will be vomiting and purging.—*Treatment.* If the child be in the city, it should be removed to the country, if possible, where it can get plenty of cool, fresh air. If this cannot be done, keep it in a large, cool room, and take it often into the fresh air during clear weather. Bathe it daily in warm or tepid water, and if weaned, let its food be tapioca, arrow-root, rice-flower, and milk—the latter must be fresh and from one cow. If the child is nursing, confine it entirely to the breast. Gum-water, or rennet whey, with a little gum arabic, should be given as a drink. To relieve vomiting, give ten drops of the following mixture every half hour: 1 drachm camphor, 1 ounce sulphuric ether.

SUMMER COMPLAINT.—Six drops of laudanum to half a tumbler full of rice-water; half a tumbler of the mixture to be taken every three or four hours. This simple remedy may be given to infants, children, or at any period of life, and has never failed to give immediate relief; and, if persevered in for a few days, it invariably effects a cure, however violent the disorder.

TYPHOID FEVER.—Quinine is a good remedy in this disease, and it may be given in large doses. Give the patient plenty of good, fresh air, and wash the skin several times a day with cool or tepid water, as may be

most agreeable to the patient. Restrain diarrhœa by small doses of burnt brandy, or small and repeated doses of Dover's powders; and prevent costiveness by giving gentle doses of salts or castor oil. The bowels must be kept regular, both extremes being avoided. Reduce the fever by giving from five to ten drops of the tincture of veratrum veride every hour; and if there is severe and constant pain in the head, the hair should be cut short, and the head bathed frequently in cold water. Very weak old hyson tea makes an excellent wash for the mouth.

BILIOUS FEVER.—First give an emetic, and follow it with a mild cathartic. Sponge the body all over, several times a day, with cool or tepid water, and give cooling drinks. Two scruples of cream of tartar, in a quart of water, is an excellent drink in this complaint. The patient should also have ice-water to drink, or he may hold a small lump of ice in his mouth. To reduce the fever, give five to ten drops tincture of veratrum veride every two hours. During intermissions of the fever, quinine should be administered.

GOUT.—Take a teaspoonful of the following mixture three times a day, until relief is afforded: Wine of colchicum root, half ounce, magnesia one scruple, sulphate of morphia, one grain, peppermint water, one and a half ounces. Bathe the inflamed parts often in a solution of bicarbonate of soda in tepid water, keep the bowels regular, and drink freely every day of good, strong coffee.

CONGESTIVE FEVER.—Should be treated the same as bilous fever, and when the patient begins to recover, let him have a light, nutritious diet, with out-door exercise, and a mild tonic two or three times a day.

FEVER SORES.—*a*. Take of hoarhound, balm, sarsaparilla, loaf sugar, aloes, gum camphor, honey, spikenard, spirits of turpentine, each one ounce. Dose, one tablespoonful, three mornings, missing three; and for a wash, make a strong tea of sumach, washing the affected parts frequently, and keeping the bandage well wet.—*b*. Take two and a half drachms of blue vitriol, three drachms of alum, six drachms of loaf sugar, and put them into a pint of good vinegar, adding three tablespoonfuls of honey. This is an excellent wash for fever sores and scrofulous humors.

CHILLS AND FEVER.—First clear the bowels with some suitable cathartic—this should be done immediately after the fever succeeding the first chill subsides. Then give quinine, in three grain doses, every three hours, giving the last dose at least two hours before the time for the next chill. When the disease is broken, continue to take a little quinine every day until after the ninth day. Persons subject to chills and fever should avoid the hot sun, and the damp evening and morning air. The following is an excellent chill remedy. It should be taken every hour, a wine-glassful at a

time, until the disease is broken: Twenty grains quinine, ten grains subcarbonate of iron, and one pint diluted gin or port wine, well mixed. Persons who cannot take quinine would do well to use the following mixture; Two ounces Peruvian bark, one ounce wild cherry-tree bark, one drachm cinnamon, one teaspoonful powdered capsicum, one ounce sulphur, and two quarts of port wine. Let it stand twenty-four hours, and take a wineglassful every two hours. This will cure any case of chills.

RHEUMATISM.—*a.* One gill of alcohol, one of beef's-gall, one of spirits of turpentine, one of sweet oil, and four ounces of camphor gum. Put them all in a bottle and shake it up; use it two or three times a day, a teaspoonful at a time. Apply it to the parts affected before the fire. It is also good for frost-bites.

b. Peel off the outside bark of the alder, scrape off the green bark that is under it, and stew in lard till it is crisp. This is a most valuable salve, and of positive efficacy in cases of rheumatism, burns, corns, etc.

Hop poultices applied to the affected joints will generally afford relief from the pain of rheumatism. It will also afford great relief to bathe the joint, just before retiring to bed, with hot sweet oil, and then bind cotton-batting upon it and let it remain all night.

SCROFULA.—This disease requires special attention to the general health. The patient must have a simple, nourishing diet, and one that will keep the bowels open and regular, such as fresh meats, cooked rare, poultry, soups, milk, hominy, and plenty of wholesome vegetables. For internal treatment nothing is better than to dissolve two scruples of iodide of potassium and one of iodine in two tablespoonfuls of water, and give ten drops three times a day, just before meals. Give, also, three times a day, twenty-five drops iodide of iron, in a little water. Bathe the swellings or tumors several times a day, in a strong solution of soda and water, and if they become inflamed apply poultices of powdered slippery elm and bay-berry in equal parts. When ulcers have formed, wash them clean with castile soap-suds two or three times a day, and dress them with a salve made of beeswax and olive oil; or, if the ulcers are indolent, use red iodide of mercury ointment instead. Flannel or silk should be worn next to the skin, summer and winter; and the entire body should be washed every day in a solution of saleratus and water, and rubbed dry with a coarse towel afterward.

SCURVY.—Persons who eat plenty of fresh vegetables and fruit, will rarely have the scurvy; and these are good remedies in case of an attack of the disease. Potatoes, scraped and eaten raw, will cure scurvy. Vinegar is also an excellent remedy. Take three ounces of nitre and dissolve it in one quart of good vinegar. Dose, one table-spoonful, if the stomach

will bear it; if not, take less. Or flour of sulphur, two parts; cream of tartar, one part. Four large teaspoonfuls to be taken every morning in milk or treacle. Wash the gums in a solution of equal parts of tincture of myrrh, catechu, and Peruvian bark.

TEETH, To CLEAN.—Charcoal and honey mixed together and used as a dentifrice, will whiten the teeth with a few applications.

BOILS.—It is not desirable, in the treatment of boils, to drive them back, for if that is done they are apt to poison the system and cause worse disorders. They should be poulticed and brought to a head as quickly as possible. Make a poultice of ginger and flour, and lay it on the boil. This will soon draw it to a head. A poultice of bread and milk is excellent. A piece of fat bacon or pork laid on a boil will bring it to a head in a few days. A poultice of honey and flour is also very good. Boils treated by any of the above means will not need lancing. If they continue to come out in successive crops, cleanse the system by taking alterative medicines, or repeated doses of bicarbonate of soda.

HUMORS.—Take saffron and seneka snakeroot equal parts; make a strong tea; drink one-half pint per day, and this will drive out all humors from the system.

PROUD FLESH, To REMOVE.—Pulverize loaf-sugar very fine, and apply it to the part affected. This is a new and easy remedy, and is said to remove it entirely without pain.

CARBUNCLES.—These generally require lancing, but unless very malignant, they can be cured by persistent poulticing. An oat-meal poultice, either before or atfer lancing, is very good. A weak solution of lunar caustic is an excellent wash to be used after the sore has opened. Quinine, or a tincture of Peruvian bark, should be taken during recovery, to strengthen and tone the system.

ULCER.—Boil the leaves of the walnut tree in soft water, and frequently wash the sore with it, keeping a cloth wet with the wash on the parts all the time.

ULCERS, INWARD.—Take of the bark of sassafras root, two ounces; blood-root, gum myrrh, winter bark and aloes, each one ounce, and two ounces of colt's-foot; steep them together in two quarts of rum, and when cool, drink one glass every morning before eating.

BURNS OR SCALDS.—*a.* Burn the inside sole of an old shoe to ashes, and sprinkle the ashes on the affected parts.

b. Spread a plaster of Turner's cerate, and apply it to the wound twice a day.

c. Beat an apple with salad oil until it is a poultice, pretty soft; bind it on the part, and as it dries, lay on fresh. You must be sure to pare,

core and beat your apple well, for fear of breaking the skin of the burn. But if the skin be off, there is nothing in nature so sure to take out the fire. Raw cotton, spread out thin, and applied to a burn, is a good dressing.

BLISTERS, ON THE FEET.—Occasioned by walking, are cured by drawing a needleful of worsted thread through them; clip it off at both ends, and leave it till the skin peels away.

GUN-SHOT WOUNDS.—The bullet or shot must always be removed, if they can be felt, either with the hand or probe. If allowed to remain in the flesh, the lead may poison the blood, or the ball may change its position and cause great suffering and even loss of life. During the first two or three days, the wound should be kept covered with cloths dampened with cold water, to keep down inflammation and fever. After suppuration begins, ointment and poultices should be applied, and the wound kept clean by washing frequently with tepid water.

BITES AND STINGS OF INSECTS.—The best applications for the poisoned bites and stings of mosquitoes, spiders, bees, wasps, etc., are strong brine, hartshorn, sugar of lead, laudanum, tincture of iodine, or tincture of arnica. Any of these applications will neutralize the poison and remove the pain.

BITES OF SERPENTS.—Every person should know what to do in case of a bite from a serpent, for the application of the remedy must immediately follow the bite, to prevent the poison from being disseminated through the system; and as wounds of this character are generally received in the country, remote from medical aid, the remedies must be of the simplest character. If the bite is in a limb, as is generally the case, instantly bind a cord or handkerchief, as tight as it can be drawn around the limb above the wound; then wash the wound clean and suck the poison out with the mouth. This must not be done, however, unless the teeth are sound and the mouth free from sores or ulcers. A more certain remedy is to cut out a piece of flesh surrounding the wound, and then sere the cut with a hot iron, or apply caustic potash to it. If within reach of medicines, saturate lint or batting with a mixture composed of iodine, thirty grains; iodide of potassium, thirty grains; water, one ounce, and apply it to the wound, and keep it wet with the mixture until a cure is effected, which will be in a few hours, at farthest. Common wild purslane, beaten into a pulp and applied as a poultice to a snake bite, is a certain and speedy remedy. Also the leaves of the white walnut or butternut tree, applied in the same way. These remedies are employed by the Indians of the West, who rarely experience any serious results from the bites of serpents.

If bitten by a rattlesnake, the surest and quickest antidote is whisky or gin, taken in large quantities. When the poison has begun to take effect, the patient can hardly drink enough to produce intoxication.

SPRAINS AND BRUISES.—Mix equal parts of beef-gall and vinegar; apply it often to the parts injured, and dry it by the fire.

SWELLING—From a bruise, to prevent.—Immediately apply a cloth, five or six fold, dipped in cold water and new dipped when it grows warm.

RUPTURE.—Make a plaster of the yolk of three eggs, mixed with a gill of brandy; simmer together and use it as a plaster; at the same time drink freely of white oak bark tea, and keep up the rupture with a good truss.

WHITE SWELLING.—This disease usually attacks the knee-joint; sometimes the hip, ankle, or elbow. It begins with stiffness, slight swelling, and a severe, penetrating pain in the joint. The pain is greatly aggravated by the slightest movement. These symptoms are soon followed by increased swelling and suppuration, the matter being discharged from different openings or ulcers. The bones become affected, and if the disease is not arrested, the patient will die. The worst form of white swelling cannot be cured, and the limb must be amputated to save the patient's life; but the disease, generally, can be governed by proper treatment. The stomach and bowels should be cleansed, the former with an emetic, and the latter with a cathartic, and this should be followed with tonics and gentle alteratives to keep the bowels open. The patient must have a generous diet, and whatever is calculated to build up the general health. For external treatment apply an oatmeal and bran poultice, mixed with a little finely pulverized charcoal, cayenne pepper, and salt, and if the pain be very great, sprinkle a few drops of laudanum on the poultice.

FELON.—*a*. It is said that a poultice of onions applied morning, noon and night, for three or four days, will cure a felon. No matter how bad the case, lancing will be unnecessary if the poultice is applied. The remedy is a sure, safe, and speedy one.

b. A poultice made of equal parts of slippery elm bark, ground flaxseed, poke root, and lobelia seeds, mixed with hot lye, is an excellent application for a felon. It should be changed twice a day. It will greatly relieve the pain of a felon to carry the arm in a sling, which prevents the blood from settling to the affected member.

WEN.—*a*. Take clean linen rags; burn them on a pewter plate, wipe off the oil on lint; and lay the lint on the wen; it will soon drop out of itself.—*b*. Take equal parts of alum and salt; simmer them together, and wash the parts three or four times a day.—*c*. The following has proved to be effectual: Make a very strong brine, dip in a piece of flannel two or three times doubled, and apply it to the wen; keep it constantly wet, night and day, until suppuration takes place.

CANCER.—If applied in time, the following remedy will cure a cancer:

Burn the inner bark of the common red oak to ashes, from which make a strong ley, and boil it down to the consistency of thick molasses, and apply it as a plaster twice a day to the sore. It will kill the tumor and cause it to drop out by the roots. At the same time drink freely of a tea composed as follows: A handful of winter-green, root and branch, and two ounces of sulphur to a quart of water.

BUNIONS.—Remove the pressure from the affected part, keep the foot elevated on a chair or stool, and apply poultices to keep down inflammation.

SORES—Old and inveterate.—Take copperas, white vitriol, rock salt, linseed oil, each two ounces, and eight ounces of molasses; boil them all together over a slow fire, and when cool, half an ounce of the oil of vitriol, four ounces of the spirits of turpentine, and two ounces of the oil of tar. Mix all well together, and the salve is fit for use.

NECK—Stiff.—Take two parts sweet oil and one part hartshorn; shaken well and corked very tight. Rub well.

NECK—Criss in.—As soon as you find your neck stiff or turned to one side by the contraction of nerves, apply over the place diseased a piece of black oil-cloth, with the right side to the skin, and then with a thick handkerchief tie up the neck; in a short time the part will grow moist, and by leaving it thus during the night or through the day, the pain will be removed.

EYES—Inflamed.—Pour boiling water on elder-flowers, and steep them like tea; when cold, put three or four drops of laudanum into a small glass of the elder-tea, and let the mixture run into the eyes two or three times a day, and the eyes will become perfectly strong in the course of a week.

EYES—Weeping.—Wash the eyes in chamomile tea night and morning.

EYES—Stye.—If the case is severe, apply a poultice, and open the swelling as soon as it begins to point. When the discharges cease, apply a little diluted nitrate of mercury ointment, on retiring to bed, for two or three nights. If styes continue to form, cleanse and tone up the system with alteratives and tonics.

For a common stye, the following is a good remedy: Bathe the eye frequently with warm water until the stye breaks; then rub the edge of the eye-lid with an ointment composed of one part citron ointment, and four of spermaceti, well mixed.

EYES—Inflamed lids.—Bathe the lids several times a day in a wash composed of sulphate of zince, twelve grains; laudanum, two drachms; soft water, twelve ounces.

EYES—Wild hairs in.—In this complaint the roots of the eye-lashes are diseased, and project through the eye-lid and irritate the ball of the eye. The only remedy is to remove the diseased lashes with a pair of tweezers, and continue to do so as long as any remain.

EARS—Wax in.—The ears should be kept clear of wax, for health and decency's sake. Syringe the ear gently, now and then, with warm castile soap suds, and insert a little cotton loosely, for a short time afterwards.

EAR-ACHE.—*a.* Take a tablespoonful of fine salt, and tie it up in a little bag, heat it quite hot, and lay it on the ear, shifting it several times; it will afford a speedy relief.

b. There is hardly any ache to which children are subject, so bad to bear, and so difficult to cure, as the ear-ache. But there is a remedy never known to fail. Take a bit of cotton-batting, put on it a pinch of black pepper, gather it up and tie it, dip it in sweet oil and insert it in the ear. Put a flannel bandage over the head to keep it warm. It will give immediate relief.

EAR—Accidents to the.—1. In case of very little insects getting into the ear, they will be immediately killed by a few drops of olive oil poured into the ear. If a child put a seed, a little pebble, or any small body of that nature into the ear, it may often be extracted by syringing the passage strongly with warm water for some time. 2. If any hard substance gets into the ear, and becomes fixed, lie quietly down on the affected side, and send for a physician. 3. If a fly or other insect gets into the ear, fill the ear with sweet oil, and then syringe it out with warm water. Sometimes it will be sufficient to hold the head on one side, with the obstructed ear up, and have it filled with warm water. In a few minutes the insect will rise to the surface and can be easily removed.

EAR—Neuralgia of.—This is generally caused by decayed teeth. Fill or remove such teeth, and the complaint will generally cease; but if it does not, then treat for neuralgia.

NOSE—Foreign bodies in.—Close the mouth, press the thumb or finger tightly over the opposite nostril, and blow forcibly through the obstructed side. If this fails, press the thumb against the nose above the obstruction, then make a hook of a piece of wire or knitting-needle, and pushing it up over the obstruction, gently pull it down. Children, in play, often put beans in their nose, and if not quickly removed they will swell and cause great pain, and sometimes death.

NOSE—Bleeding of.—To stop bleeding at the nose, blow a little powdered alum or gum-arabic up the nostril through a quill. Pressing the finger over the small artery near the wing of the nose, on the side from which the blood is flowing, will stop the hemorrhage. If the bleeding is so great as to endanger the life of the patient (which is very rarely the case,) stop the nostril with lint, soaked in a strong solution of alum.

TOE-NAIL—Ingrowing.—1. Keep the top of the nail, near the middle, scraped very thin with a sharp pen-knife. 2. Bathe the toe in strong,

warm lye, twenty minutes every day; after which apply a poultice of ground slippery elm bark and weak lye, changing it twice a day. When the inflammation is subdued, press a little fine lint under the edge of the nail, and at each dressing cut away as much of the nail as is raised out of the tender flesh, until all the appending portion is removed. 3. Press a little lint between the nail and the tender flesh, then wet a piece of nitrate of silver and rub the nail near the lint thoroughly with it, being careful not to touch the flesh. In a day or two the nail will become black, and can be removed without pain. If the nail is very thick, scrape off the back portion after the first application of nitrate of silver, and apply the second time.

GALLING OR CHAFING.—When the neck, arm-pits, thighs, etc., become chafed or galled in hot weather, wash the parts clean with castile soap suds, and rub them with starch or powdered slippery elm bark—the latter is more curative. When children become scre about the private parts, they should be treated in the same way.

CHOKING.—1. If the substance has not gone beyond the reach of the thumb and finger, thrust them down the throat and endeavor to pull it out. If the obstruction be down some distance, it may be pushed on into the stomach with some smooth, blunt instrument. 2. Give a pinch of snuff and cause the patient to sneeze violently. 3. In case of the sudden and dangerous choking of a child or grown person, requiring instant relief, press the left hand against the chest of the choking person, throwing the body forward, and at the same time give a smart blow or two between the shoulders.

BLEEDING FROM WOUNDS—To stop.—If profuse bleeding occurs from a wound in the arm, the whole current of blood to that limb may be cut off by some one pressing the thumb firmly into the neck behind the middle of the collar bone. The handle of a door-key wrapped in several folds of cloth to prevent it from bruising the flesh, may be pressed upon this place and held until a physician can be sent for. Dangerous bleeding from the thigh or leg can be stopped by pressing upon the great artery just below the crease of the groin. If the wound be below the middle of the thigh or upper arm, pass a strong handkerchief or cord once or twice around the limb, as far above the wound as possible, and tie it firmly. Then pass a stiff stick under it, and turn it around like the handle of an auger, until the circulation is stopped. This should be held in place until the arteries are tied and the wound dressed.

The bleeding of an artery can be distinguished from that of a vein by the fact that the blood spouts out in jets, like the beating of the heart, and the hemorrhage must be stopped at once, or the patient will die.

DEATH, Apparent, from noxious vapors.—When persons become

insensible from breathing the foul air collected in a well, cellar, cavern, or other place, convey them at once to the open air, and sprinkle cold water upon the face and head, at the same time rubbing strong vinegar about the nostrils. As soon as consciousness begins to return, give a drink of strong lemonade, or a few drops of aromatic sulphuric acid, in a glass of cold water, slightly sweetened.

DEATH—Apparent, from lightning.—Place the patient in a current of fresh air, and dash cold water upon the face, neck and breast. If the body is cold, restore the warmth by rubbing and friction. If breathing has ceased, endeavor to restore it by the same method used in apparent death from drowning.

DEATH, Apparent, from the fumes of charcoal.—Use the same remedies as in case of apparent death from noxious vapors, and excite breathing by the same process employed in restoring a person apparently dead from drowning.

DEATH, Apparent, from drowning.—The patient must be treated instantly, on the spot, unless the weather is so cold there is danger of freezing. Rip the clothes off down to the waist, and expose the chest and face to the open air. Then quickly and gently place the patient on his face, with one wrist under the forehead. This position will cause the tongue and fluids to fall forward, and leave the passage to the wind-pipe free. Wait a few seconds to see if the patient is breathing; if not, turn quickly on the side and excite the nostrils with snuff, or tickle the throat with a feather; at the same time dashing cold water on the face, which must previously have been rubbed dry and warm. If there is still no indication of breathing, or if the breath be feeble, proceed at once to excite artificial breathing. Turn the patient again on his face, supporting the breast on a large pillow, folded coat or other articles of clothing. Then gently turn the body on the side, and a little beyond, and quickly back again on the face; and repeat the turnings back and forth, occasionally varying the side, fifteen times in a minute, until life returns. When the patient is on the face, rub the extended palm of the hand, or better, a piece of dry flannel, firmly along up the back of the chest, discontinuing it immediately before turning the body on the side. This gliding pressure aids in expelling the air from the chest, and is an important item in the restoration of the patient, but it must be discontinued the moment the body is in a position on the side to let the air in again. During the above treatment the limbs must be rubbed upward toward the body, energetically and with a firm, grasping pressure, using handkerchiefs, or warm, soft flannels if at hand. This pushes the blood up along the veins toward the heart, and starts the circulation. It dries and warms the limbs also, which should be clothed or covered with

woolen cloths. If at hand pour a teaspoonful of aromatic spirit of ammonia into the nostrils, and thrust a feather into the nostrils, dipped in water of ammonia. When natural breathing has been restored, give a stimulating injection of spirits, or better, if at hand, a pint of warm water, with a tablespoonful of ground mustard, and a teaspoonful of pulverized cayenne, and put a mustard poultice upon the arms and between the legs.

This is the best treatment known for restoring an apparently drowned person, and it has brought back hundreds to life who would have perished without it. The treatment should be continued for hours, or until there is no longer a ray of hope.

DEATH—APPARENT, FROM HANGING.—Employ the same means to restore breathing as in cases of drowning. Bathe the forehead and face with vinegar, or camphor, and pass hartshorn frequently under the nostrils.

ACCIDENTS AND WHAT TO DO.

ACCIDENTS ON WATER.—If upset in a boat, or otherwise thrown into the water, and unable to swim, do not become frightened or lose your presence of mind. Turn yourself on your back, with your head thrown back, mouth and nose up, and feet extended diagonally under water. Extend your arms, also under the water, and gently move the hands and feet up and down, being careful to keep the feet lower than the head; and wait calmly until succor reaches you. A person can float for hours in this position without fatigue. But don't forget to keep the head *above* water, and everything else *under* water.

CLOTHES CATCHING FIRE.—If your clothes catch fire, don't run or try to pour water on them; but seize the nearest shawl, cloak, or quilt, wrap it closely about your person, and throw yourself flat upon the floor. If you run or stand up, the flames will spread and increase in violence. If the clothes of a child catch fire, envelop it closely with some covering, until the flames are extinguished, and then, if the flesh has been badly burned, put it instantly into a tub of cold water, or dash cold water upon it to prevent the burn from becoming deep.

If you are in a crowded theatre, church, or other building, and an alarm of fire is given, do not become panic stricken and rush with the crowd. Keep cool, and endeavor to restrain the excitement of those around you. Few fires occur where all cannot be saved if they act with reasonable pres-

ence of mind. The quickest and safest mode of egress from a crowded theatre is often over the stage and through the scenery.

If you are thrown from a horse or fall from any elevated position, endeavor to keep the legs and arms extended, so as to protect the vitals. It is better to break an arm or a leg than your back, neck or head.

If wounded in any way when alone, and the blood spurts out in jets, like beats of the heart, an artery has been cut, and you must not try to run for help until you stop the bleeding. If an artery is cut, compress *above* the wound; if a vein, compress *below*.

For dust in the eyes, avoid rubbing; dash water in them; remove cinders, etc., with the round point of a lead pencil.

For slight burns, dip the parts in cold water; if the skin is destroyed, cover with varnish.

Smother fire with carpets, etc., water will often spread burning oil and increase the danger. Before passing through smoke, take a long breath, then stoop low; but if carbonic acid gas is suspected, walk erect.

POISONS AND THEIR ANTIDOTES.

GENERAL RULES.—1. In case of poisoning, if none of the specific antidotes are at hand, incite vomiting with the finger, or a feather; or better, by drinking a glassful of warm water, into which a teaspoonful each of ground mustard and salt have been stirred. This will produce vomiting in about one minute. Then swallow the whites of two or three eggs, in a cup of strong coffee, sweet cream, or milk. If neither coffee, cream nor milk is at hand, swallow the eggs alone.

2. For acid poisons, give alkalies; for alkaline poisons, give acids—white of egg is good in most cases; in cases of opium poisoning, give strong coffee, and keep moving.

3. In all cases of poisoning, give the antidote as quickly as possible.

AMMONIA.—Water of ammonia, or hartshorn, in an undiluted state, is a violent poison. Vinegar, mixed with a little water, is the antidote.

ANTIMONY.—Tartar emetic, and wine of antimony, if taken in too large doses, will act as poisons. Give a strong tea of slippery elm, or flaxseed, with twenty-five drops of laudanum. A strong tea of oak bark should also be taken, to neutralize the poisons.

ARSENIC.—Use the stomach pump instantly, if one can be had; if not, excite vomiting as in General Rule No. 1. As soon as it can be obtain-

ed, give hydrated sesquioxide of iron, in tablespoonful doses, mixed with water, every five or ten minutes, until half a dozen doses are taken. If this cannot be obtained, give twenty grains sulphate of zinc (white vitriol) in a little warm water. Treat the inflammation of the stomach, which always follows poisoning by arsenic, with mustard poultices, liquid diet, and mucilaginous drinks.

VERDIGRIS.—Incite vomiting, as in Rule No. 1. Then give two teaspoonfuls of common bread soda in a tumblerful of water. Follow this with whites of eggs, diffused in water, and mucilaginous drinks.

CORROSIVE SUBLIMATE—*Bed-bug poison.*—Use the stomach pump, if convenient. If not mix the whites of a dozen eggs with a quart of cold water, and give a glassful every two minutes until the stomach will contain no more. If there are not eggs enough at hand, supply the deficiency with sweet milk or cream. Wheat flour, mixed with water, is a good remedy. The resulting inflammation should be treated by poulticing or bleeding.

SUGAR OF LEAD—LEAD, ETC.—Apply Rule No. 1. Then give diluted sulphuric acid, or Epsom salts.

LYE.—Give vinegar, or oil. Both are antidotes, in the order given.

SALTPETRE.—Cause vomiting by lukewarm water, or tickling the throat with a feather. Irritating emetics must not be given in this case.

WHITE VITRIOL.—Apply Rule No. 1, and then give freely of bread soda in water.

OXALIC ACID.—This resembles Epsom salts, and can be distinguished only by the taste—salts being *bitter*, and oxalic acid very *sour*. In case of poisoning by this drug, take magnesia, in water, immediately; or use the stomach pump, if at hand. When neither of these can be had, take chalk, lime, or saleratus.

ACONITE (*wolf's-bane, or monk's-hood.*)—Use the stomach pump, or apply Rule No. 1. Then give stimulants of brandy, gin, rum, or whisky.

OPIUM, MORPHINE, LAUDANUM.—Apply the stomach pump, or Rule No 1. If the patient is inclined to sleep, take him into the open air, and keep him moving as rapidly as possible; dash cold water into his face, stimulate him with brandy, or do any reasonable thing to keep him awake. If he still falls asleep, apply the means for producing artificial breathing, as in case of a person apparently dead from drowning. Plenty of very strong coffee is a good remedy for poisoning by opium, morphine or laudanum.

STRYCHNINE.—Employ the same remedies as for poisoning by opium, except that liberal draughts of sweet milk should be given. Two ounces of camphor, dissolved in a quart of whisky, and given in large drinks, is also an antidote.

SPANISH FLIES.—Give large draughts of sweet oil, sugar and water sweet milk, or flax-seed tea. Relieve the ensuing inflammation of the bladder with a liniment of camphor and sweet oil, and give camphor internally, to relieve the scalding of the water.

DOGWOOD, POISON IVY, ETC.—Give an energetic cathartic of salts, or castor oil, and if the surface it affected, wash the parts with a strong decoction of hazel bark, or solution of sugar of lead.

BELLADONNA, HYOSCYAMUS, STRAMONIUM (*Jamestown-weed*).—These are narcotic poisons, and must be treated the same as poisoning by opium.

PRUSSIC ACID.—This the deadliest of ali known poisons. A single drop of the acid will cause immediate death. The antidote is hartshorn, diluted with six parts water, given freely.

PHOSPHORUS. — Children sometimes swallow the phosphorus on matches, and are poisoned by it. Apply Rule No. 1. After which give copious draughts of magnesia, suspended in water, followed by mucilaginous drinks.

MUSHROOMS.—Rule No. 1, followed by Epsom salts, and stimulants. If inflammatiom should follow the treatment, the stimulants must be discontinued, and the inflammation treated as in other cases.

TOBACCO.—Empty the stomach by Rule No. 1.; then apply mustard to the abdomen and extremities, and give strong coffee and brandy.

POKE ROOT.—Rule No. 1., followed by castor oil as a cathartic, and stimulate with strong coffee, camphor or opium.

ALCOHOL, SPIRITUOUS LIQUORS.—After emptying the stomach give strong coffee, or teaspoonful doses of aromatic spirits of hartshorn, diluted with water. Also pour cold water on the head and back of the neck, and rub or slap the ankles, wrists, palms, and soles of the feet.

MISCELLANEOUS.

TOOTHACHE.—Saturate a piece of cotton with oil of cloves, creosote, or laudanum, and insert it in the cavity of the tooth. Also rub the cheek or face, just over the troublesome tooth, with whisky or laudanum. As soon as the pain is relieved, go to a good dentist and have the tooth filled; or if it is too much decayed to be saved by filling, have it drawn out. Decayed teeth should always be treated or removed, for they infect the breath and greatly injure the health. Keep the teeth clean by daily washing with

a good, clean brush. The friction does not injure the teeth, as many suppose, but the dirt and filth that are often allowed to remain do.

ICE—To FREEZE.—Mix six drachms sulphate of soda, four drachms hydrochlorate of ammonia, two drachms nitrate of potash, and four drachms diluted nitric acid. Enclose the liquid to be frozen in a thin vessel and immerse it in the mixture. It will freeze almost instantly.

The following combinations may also be used for freezing ice:

Muriate of ammonia, five ounces; nitrate of potash, five ounces; water, sixteen ounces.

Nitrate of ammonia and water, equal parts.

Phosphate of soda, nine parts; diluted nitric acid, four parts.

Sulphate of soda, eight parts; muriatic acid five parts.

Snow or pounded ice, two parts; salt, one part.

Laws of Business and Mercantile Usages.

CONTRACTS.—A contract is defined as "an agreement between two or more persons based upon a sufficient consideration to do or omit a particular thing."

When the act to be performed is described, and the consideration therefor is stipulated, it is called an express contract.

An implied contract is where the law presumes that there must have been some understanding with regard to the service rendered by reason of one of the parties accepting some benefit from it. An implied contract is as binding as an express one.

Contracts are of two kinds, namely, contracts under seal, and parol contracts.

A contract under a seal or a specialty is the highest class of agreement that can be entered into, and cannot be varied or explained by any agreement affecting it, unless in writing and also under seal, and where the receipt of the consideration is confessed or named, and such consideration cannot be denied, even though none was received, or a larger amount named than the actual consideration. Actions also can be brought on agreements under seal after a lapse of a longer time than on ordinary parol contracts.

Parol contracts may be either verbal or written, and are equally binding.

In order to make a binding contract, whether parol or under seal, several conditions are necessary, either of which being omitted avoids the contract, or renders it voidable.

A contract in order to be binding must be entered into by two or more persons who are capable of contracting, and the agreement must be founded upon a good or valuable consideration, which must be lawful, and the act to be done lawful, and not contrary to public policy. The agreement must also be mutual, binding both parties, and there must be an assent or union of minds at the time the contract is entered into.

Where parties are legally competent to contract, and the subject-matter and consideration are lawful, there must be, in order to make the agreement binding, a distinct proposition by one party, which must be duly and immediately accepted by the other.

A mere offer or overture unaccepted is binding on neither party, and may be withdrawn at any time. Where an offer is made and not accepted at

the time, a subsequent acceptance will not bind the other party, for in the mean-time he may have changed his mind. A proposition may be made, however, and a valid agreement entered into, leaving it open for acceptance for a certain length of time, by giving what is called a refusal, but such refusal must be based upon a valid consideration.

Where a promise is made on each side, they must be made at the same time, binding on both parties, or they will be binding on neither; but a bargain may be put in such shape that it will be obligatory on one party and optional with the other, if it is based upon a sufficient consideration.

Where an offer is made by letter and accepted in the same manner, or by telegraph, the contract is a written one.

If a proposition be made by letter the acceptance should be immediate, and the contract is closed when the letter accepting the proposition is mailed.

An offer by mail may be withdrawn at any time, but in order to take effect the revocation must reach the party to whom the proposition is made before he sends his letter or dispatch accepting it.

An acceptance, to be binding, must be in the very terms of the proposition; any alteration makes a new proposition.

There are several exceptions to the rule requiring a contract to be mutual, and the assent to follow the proposition:

1. An offer of reward. Here the act which entitles one to the reward can be performed without previous acceptance.

2. A minor can, in many cases, hold the other party to the performance of his contract, while he can set up his infancy as a bar to an action brought against himself.

3. A person, induced through fraud to enter into a contract, can hold the other party, or avoid it, by setting up the fraud as a defense to any action brought against him under it; but if, after the discovery of the deceit, he accepts any further benefit from the contract, it is thereby ratified, and the fraud cannot then be set up as a defense.

4. A party compelled to enter into a contract through force, may ratify or avoid it at his option after the duress is removed.

5. Contracts required by the statute of frauds to be in writing admit of a remedy against the parties signing, while they deny any against those who have not signed.

No particular form of words is necessary to constitute a valid and binding contract, but where the agreement is in writing, care should be taken to have its provisions fully set forth. A verbal agreement may be changed by a verbal amendment, if in writing the change should be in writing signed by the party assenting to it, and if under seal, the alteration should be under seal.

A contract to perform any act in controvention of public policy, or to do an unlawful act, or if the consideration upon which it is founded is illegal, it is absolutely void and cannot be enforced; such as contracts to commit a felony; gambling contracts, and, in some States, usurious contracts. Contracts in restraint of marriage are void, but a contract not to marry a particular person is valid; a contract in general restraint of trade is illegal and void, but if a contract is made in partial restraint of trade, as where it is limited to a particular place, it is valid.

CONSIDERATION.—The consideration is that which is given or agreed to be given or done by one party for the benefit received from or promised by the other.

A consideration may be good or valuable.

A good consideration has no pecuniary value, but rests on moral duty, relationship, etc.

A valuable consideration consists of that which has some pecuniary value as money, labor, property, etc., or where some loss, inconvenience, or deprivation is suffered.

A promise based upon a valuable consideration can be enforced or damages recovered at law, but a promise based upon what is termed a technically good consideration, cannot be enforced.

A voluntary conveyance by a husband to his wife or a father to a son is based upon a good consideration, the relationship, and cannot be set aside by the grantor, but it can be by the creditors. A settlement, however, made upon a woman in anticipation of marriage, or after marriage in pursuance of an ante-nuptial agreement, in writing, is based upon a valuable consideration, and cannot be set aside by creditors in the absence of fraud.

PARTIES INCAPABLE OF CONTRACTING.—The following classes of persons are ordinarily incompetent to make binding contracts: 1. Infants (persons under 21 years of age). 2. Married women. 3. Persons of unsound mind. 4. Habitual drunkards. 5. Spendthrifts. 6. Persons under duress. 7. Seamen. 8. Alien enemies.

Minors are exempted from liability on their contracts, as a general rule, but in certain cases they can be compelled, after majority, to pay a reasonable price for necessary articles of food and clothing furnished during their minority. Parents are liable for necessaries furnished to minors, and it would seem that the minor is not liable if the debt is recoverable from the parent.

A minor, representing himself of age, is liable, not on his contract, but for his fraud and deceit; he is also liable for his malicious acts.

Money loaned a minor cannot be recovered, although expended for necessaries. It should be expended for him. A note given by a minor, even

though for necessary food or education, cannot be sued on, but the note can be abandoned and suit brought on the account.

An infant may ratify his acts after becoming of age, and he is then liable, and if he accepts further benefit under a contract, after coming of age, he thereby ratifies it.

A person contracting with a minor is bound, and cannot take advantage of the disability of the other party, as the law was framed to prevent minors from being wronged.

Married women are not, as a general rule, liable on their contracts; in most States, however, by special statutory enactment, a married woman may, by observing certain formalities, charge property, which is held by her separate and apart from her husband, with her debts.

The husband is liable for necessaries purchased by the wife, if he neglects or refuses to provide for his family, or in his absence, but he cannot be held on extravagant purchases not suitable to her condition in life; he will be liable, however, if he has sanctioned such purchases, or if his acts would imply an agency.

Contracts entered into by persons of unsound mind, drunkards and spendthrifts, can be set aside by themselves or their heirs or assigns, but parties in interest in such cases should have a guardian or committee appointed as required by the laws of different States.

Seamen are protected against their contracts when any advantage is taken against them.

A party who undertakes to perform an act which is impossible, or which may become so, will be liable on his contract, but if one undertakes to discharge the duties of an office, and is prevented by an act of God, inevitable accident, or by public enemies, he will be excused from that part which becomes impossible.

THE STATUTE OF FRAUDS.—In most States the English statute, passed in the reign of Charles II., has been re-enacted, with some omissions or alterations.

These statutes do not render contracts fraudulent, but are passed for the prevention of frauds and perjuries, and require that certain contracts should be made in writing, or some memorandum or note thereof made in writing and signed by the party to be charged, otherwise they are void.

The following contracts are required by the statute of frauds to be in writing:

Contracts by an administrator or executor to answer in damages out of his own estate.

Promises to answer for the debt, fault or miscarriage of another.

Contracts for the sale of lands, or any interest in or concerning them, and

in some States all leases of tenements for any space of time whatever, in cities having a certain number of inhabitants, must be made in writing.

Agreements made upon consideration of marriage.

All agreements which are not to be performed within the space of one year from the making thereof.

All agreements for the sale of goods and chattels above a certain amount, varying from fifteen to thirty dollars, unless the purchaser shall accept and actually receive a portion of the goods sold, or give something in earnest, or payment therefor.

Where the statute requires the memorandum to be "*signed*," it will be sufficient if the party to be charged writes his name in ink or pencil, or has it printed in the body of the agreement, but where it is required to be "*subscribed*," it should be at the bottom or end of the writing.

STATUTES OF LIMITATION.—Contracts can only be enforced within the time specified by the statutes of limitation in the several States. Personal actions arising on verbal or unwritten contracts are barred by the statutes of limitations in the older States in five or six years, but in some of the Western and Southern States the time is as short as two years.

Written contracts not under seal usually have a longer time before outlawing than verbal ones, and those under seal can in most States be enforced within ten or twenty years.

After a debt is barred by the statute, it cannot be revived except by the act of the debtor. An express promise to pay the debt will revive it, but such promise is usually required to be in writing.

As a rule, the statute does not run against minors or married women and other parties laboring under disabilities, until the disability is removed, but if the statute begins to run before the disability, it continues during the same.

The statute of limitation begins to run from the time the right of action accrues.

The statute will not run in favor of a debtor who absconds or absents himself from the State, but if after such absence he returns, the statute will run during a subsequent absence.

It will not run against a female marrying before coming of age, but if the coverture terminates, the statute runs continuously, although there is a subsequent marriage.

Contracts may be extinguished in several ways, as by performance of the agreement in case something is to be done or omitted, by making a new contract in regard to the same subject-matter and incompatible with the former, by settlement or composition, and by a voluntary release.

In case the agreement is under seal, the release must, as a rule, be under seal also, and a written agreement requires a release in writing. Where

money was to be paid, a receipt in full is prima facie evidence of payment, but where a receipt is given under a mistake as to facts, a balance, if due may be recovered.

Where the terms of an agreement are violated by one party, the contract can be rescinded by the one who has been guilty of no default, if the violation consists of the neglect to perform a *condition precedent*, and the abandonment of the contract places the parties upon the same basis they were before the contract was entered into.

No person of substance should make a contract binding himself where nothing could be recovered of the other party in case of a breach, or where the cost of recovery would counterbalance the damages claimed.

One should be careful not to give or bind himself to give a valuable consideration to a stranger without means for something in return, which may turn out to be worthless, as in such case no recovery can be had.

A party dealing with another of doubtful honesty or ability, should, if possible, draw the contract so as to bind the other, and leave an escape for himself, if he finds that advantage is being taken of him.

It ought to be a part of every man's religion to fulfill his contracts to the letter, and to respond in reasonable damages when not able to do so.

A man who is careless in making and performing his contracts will usually have an infinite amount of trouble, and eventually lose a large portion of his property.

When an option is offered it should be taken advantage of, and inserted in the agreement.

The greatest possible care should be taken when making contracts with shrewd men, having the reputation of being dishonest and oppressive.

No honest man will enter into a contract whereby he or his family will be in danger of being impoverished.

Sign nothing involving risk, except after mature consideration.

PARTIES to a contract may be joint or several, or both joint and several.

Where a right accrues jointly, all parties must join, to enforce it.

Where money is recovered from a joint party, he can enforce the others to contribute.

Joint parties can act for each other, and all are bound.

Where the obligation is joint and several, it is joint and several at the option of the other party.

PARTNERSHIP.—A partnership is where "two or more persons agree to combine their property, or labor, for the purpose of a common undertaking, and the acquisition of a common profit," and it may be formed for the prosecution of any lawful business or calling.

The important feature of a co-partnership, is the agreement to share the

profits and losses, but a stipulation to free one or more partners from any losses that may occur will be good between the partners themselves, although it will have no effect on the liability to third persons.

To constitute a person a partner he must share in the profits as a principal, and not as a mere agent or servant, *i. e.*, he must have a proprietary interest. Where one receives a percentage of the profits as a salary, he is not a partner.

In the formation of a partnership, the assent of all parties is requisite. One partner cannot introduce another into the partnership without first obtaining the assent of all the parties, nor can he dispose of his interest, and constitute the purchaser a valid partner, without the consent of the others.

These are the modes of forming a partnership :

1. By articles of agreement formally executed and delivered.
2. By verbal agreement.
3. By the acts of the parties.

Where two or more parties combine their property, and mutually act as partners, the law will imply a partnership, although there may be no express agreement to that effect, and where a party holds himself out as a partner he thereby renders himself liable to such as have been induced to act upon his supposed connection with the firm ; but he is nevertheless not a partner, as there is still wanting the element of consent.

There are three kinds of partners :

1st. *Real or ostensible partners* who have an actual interest in the business, and publicly hold themselves out as partners.

2d. *Dormant or silent partners*, who have an interest in the firm property and share in the gains, but who conceal their names and are not publicly known as partners.

3d. *Nominal partners*, or those who allow their names to be used to draw trade or sustain the credit of the business, but have no pecuniary interest whatever in it.

A nominal partner is liable for the firm obligations while permitting the use of his name, and a dormant partner is liable when discovered. A person entering a partnership does not become liable for the previous debts of the firm unless he specially agrees to do so.

One partner cannot bring suit against another at common law upon any obligation arising out of the partnership except after a final settlement and a promise to pay a balance due upon such settlement.

The amount invested by partners belongs to them only after all the losses and liabilities of the business are paid, and a judgment creditor of one individual partner can only levy on a partner's interest subject to the debts of the firm.

Each partner is individually liable for the entire debts of the copartnership, and his entire property may be taken, if necessary, to pay the firm liabilities, but in several States a person may become a *limited partner* by going through certain formalities prescribed by the special act of legislature creating such partnerships, and then will he be liable only for the amount invested in the business.

Each partner may act for all and bind his copartners in any matter relating to the partnership business, but there are certain limitations as to the manner in which a binding contract can be made. If the partnership articles prohibit a partner from contracting in the firm's name, he can still bind his partners if the other party acts in good faith and without notice, and a partner may bind the firm by contracts made in his own name, if for the benefit of the partnership. A partner borrowing money from another for the use of the partnership renders it liable, although converted to his own use, but if he borrows in his individual name he alone will be liable, although the money is applied to the use of the partnership. A partner selling the goods of the firm and misapplying the proceeds gives the vendee a good title, but if he pays his individual debts with partnership property, it may be recovered back, even though the creditor was ignorant of the fact that he was receiving partnership goods. A guarantee in writing, as required by the statute of frauds, although given to a single partner, inures to the benefit of all, if intended for the use of the partnership.

The payment of a partnership debt to one partner is payment to all, whether before or after dissolution, and a debt due the firm may be released by one partner. One partner may give time to a partnership debtor by taking his note or acceptance, or he may make such an agreement as will preclude the partnership from suing.

As a rule, a partner can only bind the partnership by simple contract, and the contract must be respecting the partnership business—the assurance, however, of one partner that the transaction is for the firm account will bind all the partners.

One partner cannot bind the firm by a deed, or in general by an instrument under seal, unless executed in the presence of the other partners with their assent, unless subsequently approved and adopted by them and the ratification may be verbal. A partner cannot bind the firm by a submission to arbitration, or a general assignment, or a confession of judgment before an action is brought, nor can he confess judgment in a pending suit or after the partnership has been dissolved.

A secret contract made by a partner for his own advantage inures to the benefit of the partnership if discovered. Notice to one partner is notice to all, and service of legal papers on one binds all.

DISSOLUTION OF PARTNERSHIPS.—By lapse of time, as specified in the contract; by the completion of the partnership business; by the consent of the parties or the withdrawal of one or more where no time is stipulated; by the insolvency of the firm, or a valid assignment of the firm property by one of the partners; by the bankruptcy of one partner or the sale of his interest under execution; by the death of either of the partners; by the marriage of a *femme sole* partner; by the appointment of a receiver by a Court of Chancery, as will usually be done if one of the partners becomes insane or a habitual drunkard; or if the business is found to be visionary and impracticable, and the assets are liable to be wasted; or if the conduct of one partner is so grossly improper or dishonest that the business is injured, or its continuance rendered impossible.

When a partnership is dissolved by the death of one of the partners, no public notice is necessary, nor where the partnership expires by its own limitation or by operation of law, but when a partner dissolves the partnership by his own act or withdrawal to avoid further liability, he should publish the dissolution in the principal newspapers of the place where the business is carried on, and send notices to all persons who have had previous dealings with the firm.

By special acts of the Legislatures of several States, three or more persons are enabled to form a corporation for the purpose of conducting any legal business and be liable no further than the actual amount of their stock, and this should always be done by parties who wish to make investments in any business which is to be conducted by agents or other partners, or where no personal supervision can be exercised.

A partnership contract should be entered into with very great caution, and no partnership should ever be formed with a stranger or a person of doubtful integrity or business capacity. A man of means places his entire property at the mercy of the partnership creditors, or if without much property he may be loaded down with partnership debts. As a rule, it is a bad and dangerous practice to form partnerships for the purpose of helping others along. It is better to lend the money outright and take such security as can be had; the worst that can then happen is the loss of the debt. No one should go into partnership with another unless entire reliance can be placed in his honesty and ability, and, if after forming a partnership, it is found that one or more members of the firm are about swamping the partnership by a careless or fraudulent issue of negotiable paper, it should be at once dissolved and the dissolution advertised.

AGENTS.—An agent is one who is appointed by another to transact business in his place and stead, and the party appointing the agent is called the principal.

All agencies are based upon contract, express or implied, and an implied agency arises when there is no express appointment, but such acts are performed by the agent and assented to by the principal as will indicate an authority to act in his behalf.

The power of a party to create an agency is co-extensive with his own ability to do business, and in general a man may substitute an agent to do whatever he himself has power to do in his own right; if his capacity is limited, as in case of a married woman or a minor, the power to appoint an agent is subject to like limitations, but a party incapable of acting for himself may act for others as their agent, and as the act of the agent is the act of the principal, the disability of the agent does not attach. Where nature, however, has created the barrier, as in case of insanity, imbecility, etc., there can be no agency.

An agent can act for only one party in any matter requiring discretion, and if he acts for both the contract will be set aside by a court of equity.

There are four ways of creating an agency:

1st. By a formal contract under seal. This is required in all cases where it is necessary for the agent to contract under seal, or release sealed contracts, as the agent cannot generally make a contract which is of a higher nature than his own authority. A power of attorney to *convey* lands is usually required to be recorded in the office where the owner's title to them is recorded.

2d. By a contract in writing, not under seal, and the writing may be informal, as by letter, written instructions, memoranda, etc.

3d. By verbal appointment or agreement.

4th. By implication, as where a party holds himself out as acting for another, who stands by or accepts the benefit of his acts, or sanctions them.

An agency is special or general. A special agency is an authority to do a single act, and a general agency consists of a delegation of authority to do all acts that are connected with a particular business. A factor is an agent for the sale of property, and is therefore intrusted with it. A broker is an agent for the purpose of effecting sales, and this can be done without his having charge of the property.

The acts of an agent should conform with the terms of his authority, and he should follow out his instructions; if he fails to do so he renders himself liable, and in most cases his principal will not be bound. Authority to do an act includes everything necessary to its proper performance, whether the agency is express or implied. An agent to sell may bind the owner by giving a warranty. An auctioneer, however, cannot bind by warranty without express authority. An agent to get a bill discounted may bind his principal by indorsement.

Authority to sell gives authority to sell on credit. This has an exception in the case of an agent for a State.

The principal will not be liable for the malicious or criminal acts of his agent. He will, however, be liable for his wilful and oppressive acts if done in the performance of the duties imposed upon him by the agency, also for his fraud and misconduct while in the discharge of his trust, and also for his carelessness, negligence and incapacity whereby the property of others suffers damage.

An agent cannot act adversely to his principal. He cannot appoint a sub-agent without express authority to do so, or unless sanctioned by well-known usage or custom.

An agent may disobey his instructions in the following cases.

1. Where an unforeseen necessity arises not contemplated by the parties.

2. Where circumstances render a strict conpliance impossible.

3. Where a compliance would, in effect, perpetrate a fraud upon others.

An agent is responsible to his principal for reasonable diligence in the discharge of his duties, and for the safe keeping of property in his charge.

TERMINATION OF AN AGENCY.—Where an agency is not coupled with an interest, it can be revoked at pleasure by the principal, but he will still be liable to parties dealing with the agent in good faith unless public notice is given of the revocation.

An agent can renounce his agency, but if he has entered upon it he will be liable if his principal suffers damages thereby.

An agency is also terminated:

1st. By its own limitation.

2d. By the death of the principal or agent, unless coupled with an interest.

3d. By such change in the condition of the principal or agent as will render its continuance impossible, but this will not extend to any mere formal act which passes no interest. The bankruptcy of either party terminates the agency, also the marriage of a *feme sole*, etc.

4th. An agency is terminated by its complete execution.

SIGNATURE BY AN AGENT.—An agent should sign for his principal and not for himself. The best form is "A by B, agent," or "B, agent for A, principal." If B is trustee for a corporation and signs negotiable paper simply "B, Trustee," he can be made to pay, if the corporation fails, and he has money.

Notice to an agent is notice to the principal, and knowledge of the principal is knowledge of the agent.

In dealing with a stranger claiming to be an agent always ask for his authority, and if he is really an agent he will be able to produce it.

NEGOTIABLE PAPER.—The laws applying to negotiable paper are, with the exception of a few legislative enactments, derived from the custom of merchants, and have been fixed by the decisions of the courts with great exactness.

There are three kinds of negotiable paper: The Note, the Bill of Exchange or Draft, and the Check

A promissory note is a written promise to pay a certain amount of money at a time therein limited, or on demand, or at sight, to a party named therein, or to his order, or to bearer.

A bill of exchange, or draft, is, in its simplest form, an open letter of request drawn by one party and directed to another, asking him to pay a certain sum of money to a third person, or his order, or to bearer.

A bank check is a written order addressed to a bank or a person carrying on a banking business, directing the payment of a certain amount of money to bearer, or a person therein named, on presentation.

NEGOTIABLE NOTE.—FORM.

$75.50. St. Louis, Mo., April 5, 1879.

Sixty days after date I promise to pay to the order of John Smith Seventy-five $\frac{50}{100}$ Dollars, for value received.

R. C. Spencer.

BILL OF EXCHANGE.

$100.00 St. Louis, Mo., April 5, 1879.

At sixty days' sight pay to the order of John Smith, One Hundred Dollars, for value received, and charge the same to account of

S. Simmons.

To S. S. Packard, N. Y. City.

BANK CHECK.

$200.00. St. Louis, Mo., April 5, 1879.

Fourth National Bank, pay to John Smith or order, Two Hundred Dollars.

S. Simmons.

In writing out a note the amount should be placed in figures at the left hand upper or lower corner, the place where and the time when given should be named; in other words, it should be dated, but if the date is omitted it is still a valid note and will be due at the specified time after delivery. The day of the month and year are given in figures, and the balance of the note should be in writing. The words "value received" ought to be inserted, but in most of the States they are not required to con-

stitute a valid negotiable note. In several States, however, it was formerly necessary to insert the words, "For value received, negotiable and payable without discount or defalcation," and the words, "negotiable and payable," etc., were struck out by act of Legislature, and in such case the words "value received" must be inserted or the note will not be negotiable.

The person signing a note is called the "maker," the party to whom it is payable is called the "payee," and after the payee has transferred it by indorsement on the back, he is called the "indorser," and the party receiving it is called the "indorsee" or holder, and if the indorsee transfers it he is sometimes called the subsequent indorser. The same applies to checks and drafts.

A bill of exchange usually has three parties, the "drawer," whose name is written in the right hand lower corner, and who writes out or draws the bill; the "drawee" or person to whom it is directed and whose name is in the left lower corner, and the "payee" whose name is in the body of the bill.

Where a draft is made payable at a certain time after date it should be dated. When payable after sight, as in the foregoing form, it must be presented for acceptance or it can never become due, and the acceptance is usually made by writing "accepted," and giving date and signature across the face of the bill in pale ink, the color differing from that of the draft only because it can more easily be read.

After the drawee accepts he is called the "acceptor," and the bill is frequently referred to as an "acceptance," the drawee's liability being fixed. If a bill of exchange is payable after date an acceptance is not necessary, but if in the hands of an agent its acceptance should be demanded, as he will be liable in case the drawer fails and the bill is lost by his neglect to get the signature of the drawee. A sight bill needs no acceptance, being payable on presentation without grace, and is analagous, in many respects, to a check.

A check is generally held to be an assignment of the money of the maker in the bank on which it is drawn to the amount named therein, and when a demand is made upon the paying teller, the bank has notice of such assignment and cannot pay out the money on a subsequent check without becoming liable.

The liability of the indorser of a check is the same as that of the indorser of a bill of exchange, as hereinafter set forth, but the liabilities of the drawer of a bill and the maker of a check differ. The drawer of a draft is liable as an indorser, failing to receive notice he escapes, but if a check is hoarded by the holder, thereby releasing the indorsers, the maker will only be relieved from payment so far as he has been injured by the holder's neg

ligence. Where a check is transferred to several persons in succession, each has a reasonable time to negotiate it or draw the money, generally one day each, but if a check has been in use for several days, an indorser should at once get it cashed. If a person gives a check for a valuable consideration and falsely states that he has money in the bank on which it is drawn, to meet it, he is criminally liable.

Parties to negotiable paper are *primarily liable* when they are absolutely bound to pay the bill when due, if demanded, and if no demand is then made they must pay if demanded or sued on before it is barred by the statute of limitations. The maker of a note and acceptor of a draft are primarily liable. Parties *secondarily liable* are those who are obliged to pay in case of the failure of the persons who are primarily liable, but in order to fix this secondary liability and make it absolute, certain acts must be performed by the holder or some one for him. Secondary parties are the drawer of a bill of exchange, the maker of a check and the indorsers of any kind of negotiable paper.

A bill of exchange is either foreign or inland. A foreign bill is one that is drawn in one country and payable in another. An inland bill is where the drawer and drawee reside in the same country. If the drawer and drawee live in different states it is a foreign bill although they may not be five miles apart, and if they live in the same state but in different counties it is an inland bill.

Duties of the holder.—If the holder of negotiable paper wishes to bind the drawer and indorsers he is held to a strict observance of the rules in regard to it. Any failure on his part will release them. The payee of a check or sight bill should demand payment or negotiate within a reasonable time.

The payee or holder of a bill of exchange, drawn payable at a certain time after sight, should, soon after it comes into his possession, hunt up the drawee and produce and exhibit it and demand acceptance. The drawee may accept, refuse or ask for time. If he accepts, his liability then becomes the same as that of the maker of a note, *i. e.*, he must pay. He is absolutely liable and cannot afterwards refuse to pay if he has no funds belonging to the drawer in his hands. A bank certifying a check becomes absolutely liable on it, the same as the acceptor of a draft. If the drawee refuses to accept, the bill should be protested the same or the next day and notices sent to the drawer and all the indorsers, and unless notice is sent them they will not be bound. If the bill is a foreign bill it must be protested or the drawer and indorsers will be released, but if it is an inland bill, notice alone will be sufficient.

The drawee, before accepting, may take the bill into his possession and

keep it a reasonable length of time to ascertain if there is any balance due the drawer, and such time is generally limited by the statute to twenty-four hours. If he wrongfully keeps the bill beyond this time the payee may consider the bill accepted and demand payment when due. The payee may demand an acceptance in writing according to the terms of the bill and refuse any other.

TIME OF PAYMENT.—Commercial paper may be made payable at sight or on demand, or at a certain number of days after sight or after date. If no time is named it is payable on demand. A mere acknowledgment of a debt in writing or a due bill is not a negotiable note. When a note or draft is made due a certain number of days after date the day it is issued is not counted, but the day upon which it falls due is, and in every such note or draft, by the custom of merchants, there are certain additional days allowed to the maker before he is obliged or expected to pay, and before any final demand can be made upon him. These days are three in number and are called days of grace. They attach to every bill or note having time to run unless they are specially restricted and taken out by inserting "without grace" or words to that effect.

At common law, when the last day of grace falls on Sunday or any public holiday, the bill is due on the preceding day and demand must be made on that day, but if the bill is payable by its terms without grace, then the demand should be made the day after instead of the day before. In two or three states bills falling due on Sunday, are by statute made payable on Monday.

Bills of exchange, notes and checks may either be made negotiable or or non-negotiable. They can be transferred if they contain the words of negotiability "or order," "or bearer," but it is doubtful if their mere omission will restrict the negotiability of the bill. A note to be non-negotiable should read, "I promise to pay to A B and him only," or words to that effect.

A non-negotiable note can be transferred only by assignment and must be sued on in the name of the payee, and is subject to all the equities existing between them whether the holder has notice of them or not. When a person receives a non-negotiable note or an account by assignment he should immediately notify the debtor of such assignment, and it will then be subject only to the equities existing prior to the notice. The holder of a negotiable note who received it before due in ordinary course of business, for a valuable consideration, and without notice, can, if the indorsement of the payee is genuine, sue or collect it in his own name, and if there was no consideration for the note given by the original payee, it will make no difference to a *bona fide holder* for value if received before

due. If a note, however, is given in payment of a gambling debt, it is void and cannot be collected by any indorsee receiving it for value and without notice. A note may be negotiated after due, and can be collected if it has not been already paid, provided it was given for a sufficient consideration, but the maker may interpose any defenses to the note that he could have interposed against the original payee at the time the note was due, if it is in the hands of a purchaser after maturity. If the note is negotiated before due, the holder runs no risk by keeping it until after due, as against the maker. If a note is held by a purchaser after maturity, the maker cannot offset a simple account against the payee arising out of another transaction; the offset must be against the note itself as payment, want of consideration, release, etc. If a note or bill of exchange is paid at maturity it cannot subsequently be negotiated to bind the maker or acceptor, but if a bill is paid before due by the acceptor or maker, or taken up by an indorser and subsequently gets into circulation by accident or otherwise, it can be collected by a holder for value who receives it in due course of business, before due and without notice.

INDORSEMENT.—Where a bill of exchange, note or check is made payable to bearer, or "A B or bearer," the legal title passes by delivery only, but where it is made payable to the "order of A B" or "to A B or order," it is transferable only by indorsement. There are two forms of indorsement, indorsement in blank and indorsement in full. A bill is indorsed in blank when the payee simply indorses or writes his name across the back of the bill, note or check, and it is then transferable merely by delivery, by any subsequent holder, the same as a bill payable to bearer. The name may be written anywhere on the back of the bill, but for convenience it ought to be written at right angles with the reading on the opposite side, and about one inch from the left hand margin, as this affords the best opportunity for a number of subsequent indorsements. An indorsement in full is where the payee writes, "Pay to the order of C D," above his own signature. The bill must then be indorsed by "C D," the holder, before it can be again negotiated, and he may indorse in blank or in full. If the payee indorse in blank all the subsequent indorsements will in effect be blank indorsements, although full in form. The payee may restrict the transfer of a bill, or deprive it of its negotiable quality by writing "pay to C D only," or "for my use," over his indorsement. The holder of a bill indorsed in blank is privileged to make the indorsement a full one by making himself the indorsee over the payee's blank indorsement. A bill should not be indorsed until about to be delivered to the indorsee.

LIABILITIES OF INDORSERS.—Any payee, indorsee, holder or other person, whether having interest or not, who indorses or writes his name

on the back of any bill of exchange, note or check, becomes liable to pay the same if the maker or acceptor fails or refuses to do so, or in case of a draft, if the drawee refuses to accept when thereto requested.

A holder may, however, indorse in such a manner as to incur no liability, and still pass the legal title to the bill by writing "without recourse," or words to that effect, over his signature.

A party indorsing a bill guarantees the signature of the prior indorsers, and especially that of the payee or first indorser, and also that it came into his hands in good faith for sufficient consideration. He also undertakes to pay the bill in case the maker fails to do so at maturity. The payee being of necessity the first indorser is the party who finally has the bill to pay in case the maker fails, but in case it is a bill of exchange he recovers of the drawer. Each indorser contracts to pay the holder, and an indorser compelled to pay can recover of the prior indorsers, if there are any.

Where a party writes his signature on the back of a note before it is indorsed by the payee, he is generally held as a joint maker; in some States, however, he is held to be a guarantor, and in others the intention of the parties governs.

If he is held as joint maker, or guarantor, he is not entitled to notice of the dishonor of the bill.

A bill or note may be indorsed by an authorized agent and the principal will be bound, and a bill held by a bank or other corporation may be indorsed by the cashier. If the holder dies the indorsement may be made by the administrator. If payable to two executors it should be indorsed by both, and all agents, assignees, and administrators should indorse in their representative capacity, otherwise they will bind themselves.

A partner may indorse for the partnership, but if payable to two parties, not partners, it must be indorsed by both. A note or bill held by a married woman should be indorsed by the husband.

DEMAND, PAYMENT, PROTEST, AND NOTICE.—Nothing discharges the acceptor of a draft and the maker of a note except payment, according to their terms, at maturity. If payment is not demanded the parties primarily liable must pay if demand is made subsequently, and before the bill is barred by the statute of limitation. If a bill is made payable at a bank, and the funds are provided to meet it at maturity, and no demand is made, the acceptor will escape payment only so far as he was injured by such non-presentation and demand. Demand is not made to bind the maker, he is already bound, but it is made on the day of maturity to enable the holder to fix the liability of the drawer and indorsers in case the maker or acceptor fails or refuses to pay, and in order to avail himself of this privilege the holder must make a demand of the proper party on the

very day the bill falls due. A demand made on the day before or the day after maturity is void, and the indorsers are released if no demand is made on the exact day of maturity. If the holder, by his own neglect, the negligence of others, or by inevitable accident, is prevented from demanding payment on the day of maturity, he loses all recourse against the indorsers. If the bill has been lost, mislaid, or stolen, the owner should make a demand on a copy of the bill, and at the same time have ready and tender to the maker a good and sufficient bond, saving him harmless from any damage he may suffer by reason of the bill not being surrendered at the time of payment.

When a bill is made payable a certain number of days after date, the whole number is counted, exclusive of the date of the bill, and the three days of grace added. The bill is due on the last day of grace, and not before, and the maker has the whole of the last day of grace to pay it in. If a note is payable a certain number of months after date, calender, and not lunar, months are counted, and three days added. A bill dated January 1, 1879, at one year, will fall due January 4, 1880.

If a bill is made by its terms payable at a bank, demand must be made at that bank during banking hours, as the day closes with the closing of the bank in such cases. A mere memorandum by an indorser or other party advising demand at a certain bank, may be disregarded, and the bill may be demanded at the business office of the maker during business hours. The same rules that apply in demanding payment, govern in demanding acceptance. If a bill is drawn on a stranger to the drawer who has no reason to suppose it will be accepted, the holder may treat it as dishonored. If the maker or acceptor has notoriously absconded, any attempt at demand will be excused, or if made payable in a city where the maker does not reside, and no place of payment specified.

Bankruptcy or insolvency of the maker or acceptor of will not excuse demand, and the bill must be presented on the day of maturity. In case the maker dies, demand should be made upon his legal representative. In any case where the holder is excused from making a demand he may proceed to bind the indorsers the same as though demand had actually been made.

Where to demand.—Where the bill is made payable at any specified place, demand at that place will be sufficient. If made payable generally, the holder should exercise due diligence in hunting up the maker by going to his place of business, and if not found, by going to his place of residence at such an hour as he will be likely to be at home. If the maker has removed, a reasonable effort should be made to find where he is living. In case he cannot be found at his residence or place of business, it will be

safe to leave a copy of the bill and state where and when the holder can be found, or at what hour he will call again during the day. Such notice, or any other, should be left at the person's own residence or office, and not next door.

How to demand.—1st. In case of a foreign bill of exchange any party having the legal possession of a bill of exchange may make a valid demand on the drawer for acceptance, and if it is a foreign bill, and if acceptance is refused, in order to bind the drawer and indorsers, he must place the bill in the hands of a Notary, who will again demand acceptance, and if it is refused, he will protest it. The drawer and indorsers must now be notified, and this may be done by the owner of the bill, but it has of late years been customary for the Notary Public to notify the parties.

A bill may be accepted by a stranger, who is not a party to it, for the honor of the drawer after it has been protested, and this is called an "acceptance supra protest." It is done by adding "supra protest" to the words of acceptance, and the drawer will be bound thereby. An acceptor supra protest should notify the drawer of his acceptance. When a bill thus accepted falls due, the holder is required to make a formal demand on the drawee, just as though he had accepted it, and if he refuses to pay it must again be protested, and the acceptor supra protest, and the indorsers notified of the dishonor of the bill.

When a foreign bill falls due and payment to the holder is refused, demand must be made by a Notary, and the bill protested or the drawer and indorsers will be released. Notice must also be served.

In case of an inland bill or note demand must be made, and notices served, the same as with a foreign bill. If there is a refusal to pay, but protest is not demanded in order to bind the drawer or indorsers, the notices being sufficient, and all the acts necessary to bind all parties can be performed by the holder, or some private person for him. If the bill is, however, for a considerable amount it is better to have it protested as the certificate, under seal, by the Notary will be received in the courts as evidence that demand was made at the time stated, otherwise the demand must be proved up by the holder, and it may be difficult for him to do so if some time has elapsed.

The possession of a note or bill of exchange by a Notary or other person implies the right to collect it, and in order to constitute a valid demand it must be produced with the genuine indorsement of the payee or his administrator or assignee, or accompanied by some order of the court authorizing its collection.

When a note is signed by two or more parties, who are not partners, if demanded by one and refused it, must be presented to all the rest, or the the indorsers will be released.

Where a party has indorsed before the payee, it will be safe to demand payment of him as a maker, and also notify him as an indorser; if he is then held to be a joint maker, the indorsers are bound, and if he is held to be an indorser, he is nailed by the notice.

The holder can refuse any thing short of money payment in full. He cannot give time without the consent of the indorsers, otherwise they will be released.

OF NOTICE.—Whenever a bill, note or check is dishonored, notices must be served on the indorsers on the following day, or they will be released, and the notice should contain such a description of the bill as to give the indorser no reasonable chance to mistake it.

Where the drawer, acceptor, or maker, has been guilty of such acts as to excuse demand, notices to the indorsers cannot be omitted; like acts on the part of the indorser will, however, excuse service. In case the residence of the indorser is unknown a fair effort should be made to find him and get service. An indorser living in the same town or city as the holder or maker is entitled to personal service. A notice by mail will be sufficient if it reaches him in time, but the burden of proof rests on the holder to show that it was delivered to him. Notices should be mailed to out of town indorsers before noon of the day following the one on which demand was made and refused. If the address is unknown the notice should be mailed as soon as it is ascertained.

The holder of dishonored paper can notify and hold whichever indorser he pleases by omitting to notify the balance, or he can bind all by notifying all, and if he notifies all his act inures to the benefit of all, but if he notifies only one, and recovers from him, the prior indorsers who are not notified are released. One indorser receiving notice may notify the prior indorsers, and he has one day to send his notice, and it binds them.

Personal service should be had if possible, and if the indorser is not at home, the notice should be left with some person in his employ, or with a member of his family, and not in an adjoining office, as there is no law to compel a man to stick his neighbor on his indorsement by gratuitously performing the duties of a Notary

GENERAL CONSIDERATIONS.—Where negotiable paper is left for collection with a bank, or other agency, and by neglect of their officers the indorsers are released, they will be liable.

Where an Express Company, through the fault of an employe, takes a bill for collection in a town where they have no agent or Notary, they cannot renounce the collection without giving the owner ample time to collect his bill through other parties.

A person may sign a note or check, leaving the date and amount blank,

and he will be bound by the amount inserted by the party to whom he intrusted it, and in a like manner he will be bound if he indorses a bill of exchange or note in blank.

In sending negotiable paper by mail it should always be indorsed *in full.* If a bank draft, which is payable on demand, a treasury warrant, or a check, has several blank indorsements, they should all be converted into full indorsements before being sent by mail, as they can be cashed by any one who can be identified at a bank. If there is not room to write the words of restriction over the name, strike them out altogether, unless the bill is a great deal better by having them on. Suppose the bill is indorsed in blank by "A B" and "C D," over the signature of "A B" write "Pay to the order of C D," if it is then indorsed by "E F" and "H G," and there is no room over "E F," strike him out, and over "C D" write, "Pay to the order of "H G," etc., etc.

If a note is left for collection in the hands of one having no other interest than that of an agent for collection, and it becomes necessary for him to indorse it, he should indorse "without recourse," otherwise he becomes liable on the bill if it is withdrawn and gets into circulation again before maturity.

A note made for the purpose of discount should be made payable to the person who is to indorse, and after indorsing in blank he returns it to the maker, who offers it for discount.

When a debtor gives the note of a third person for the debt, it is not absolute payment of the debt unless there is a special agreement to that effect, the remedy on the debt is, however, suspended until the maturity of the paper, and if it is dishonored it is the duty of the holder to fix the liability of the indorsers by notice.

A note or bill dated on Sunday is not void if it is delivered on another day, or if the consideration therefor was given some other day.

A note should not be given in blank to a stranger or person in irregular business, and when the body of a note or bill is written in a hand other than that of the maker, care should be taken not to leave it in such shape that a larger amount can be inserted than was intended. Irregular traveling agents have sometimes obtained the signatures of men of means who supposed they were signing a simple contract for an agency, the contract or appointment being pasted to the paper on which the signature was obtained, and then stripped off and a note written or printed above the maker's name. Such a note in the hands of a holder in good faith can be collected. No careful business man will give his note in a case where he would not be willing to pay the cash if he had it to spare.

If the payee or holder inserts any words on the face of the note above

the signature of the maker, as "with interest," etc., it cannot be collected.

Where a lender takes a commission on the loan which, added to the interest agreed upon, brings it above the legal rate, the contract is tainted with usury.

When one of several indorsers receives notice of the dishonor of a bill he should notify the prior indorsers unless certain that they have already been notified.

LIENS.—A lien at common law is the right of a party to retain the possession of property until some charge thereon is satisfied.

Where the right of lien accrues to a party, he must hold on to the property or his lien is lost If he parts with the possession he relinquishes his lien and he will then have only the right of an action at common law for the debt.

A statutory lien is where the right of a lien is given against property out of possession, and the party wishing to obtain such lien is held to a strict performance of the acts required by the statute to perfect the lien. The slightest deviation will generally be fatal to the lien.

CONTRACT OF BAILMENT.—A bailment is the delivery of goods by one party, who is called the bailor, to another person, called the bailee, upon a contract, express or implied, that the trust shall be faithfully performed by the bailee.

There are three principles which apply to the execution of the trust: 1st, Those in which the act to be performed by the bailee are for the exclusive benefit of the bailor or some other person. 2nd, Where the execution of the trust is for the benefit of the bailee alone. 3d, Where it is for the benefit of both parties, or one of them and a third party.

In the first case the bailee is liable only for gross neglect; if, however, goods are left with a party without compensation for safe-keeping and there is a refusal to deliver them when a demand is made by the proper person, he will be held to a greater amount of care than previous to demand, as the goods are wrongfully withheld.

Where the execution of the trust is for the benefit of the bailee alone, as in case of a party borrowing an article for his own use without compensation, great care must be exercised in keeping safely the thing borrowed and the bailee will be liable for slight neglect.

Where an article is pledged it is for the benefit of both parties and only ordinary care is requisite in safely keeping the goods pawned.

Where negotiable paper is left in the hands of a party soliciting collections, he will be liable for the slightest negligence whereby the indorsers are released.

Common carriers may be the carriers of goods, or persons, or both, and

are bound to receive and transport passengers or property when requested, if the price of the transportation is offered. They are obliged to exercise the greatest possible amount of care, and will be liable for the slightest negligence. If the carrier is guilty of negligence, he will be liable, although the carelessness of the passenger may in a slight degree contribute.

When property is taken to be transported, it must be safely delivered and the carrier will only be excused when the loss is occasioned by act of God or public enemies.

If a common carrier wishes to limit his liability he must bring the limitation to the actual notice of the passenger, or owner of the goods transported.

CHATTEL MORTGAGES, ETC.—A chattel mortgage without possession of the property mortgaged is, at common law, of doubtful validity, but in most states where there is a regular system of recording deeds and mortgages, a chattel mortgage gives a lien on the property without possession, if it contains a full description of it and is regularly placed upon record in the same manner as conveyance of realty.

DEEDS OF TRUST.—A deed of trust is a conveyance of the title to a trustee having no actual interest, and is generally made to secure the payment of a note or notes therein described, and if the payment is not made, the trustee, at the request of the legal holder of the note, may sell the property at auction, after giving due notice as specified in the deed, and apply the proceeds to the payment of the expenses and the note. The balance of the note can be collected of the maker or indorsers. Deeds of trust on personal property are valid if recorded, the possession remaining in the hands of the original owner, and if he disposes of the property by giving a bill of sale without reciting the prior deed, he will be liable criminally.

BILLS OF SALE.—A sale of personal property without a notorious and continuous change of possession, is void as to creditors. A bill of sale on record will not help the matter. There must be an entire change of possession or the sale will be set aside as fraudulent.

INTEREST TABLE AT 6 PER CENT.

Time.	*$1*	*$2*	*$3*	*$4*	*$5*	*$6*	*$7*	*$8*	*$9*	*$10*
1 Day.										
2 "										
3 "										.1
4 "								.1	.1	.1
5 "						.1	.1	.1	.1	.1
6 "					1	.1	.1	.1	.1	.1
7 "					1	.1	.1	.1	.1	.1
8 "				1	1	.1	.1	.1	.1	.1
9 "				1	.1	.1	.1	.1	.1	.2
10 "			1	1	.1	.1	.1	.1	.2	.2
11 "			1	1	.1	.1	.1	.1	.2	.2
12 "			1	.1	.1	.1	.1	.2	.2	.2
13 "			1	.1	.1	.1	.2	.2	.2	.2
14 "			1	.1	.1	.1	.2	.2	.2	.2
15 "		1	.1	.1	.1	.2	.2	.2	.2	.3
16 "		1	.1	.1	.1	.2	.2	.2	.2	.3
17 "		1	.1	.1	.1	.2	.2	.2	.3	.3
18 "		1	.1	.1	.2	.2	.2	.2	.3	.3
19 "		1	.1	.1	.2	.2	.2	.3	.3	.3
20 "		1	.1	.1	.2	.2	.2	.3	.3	.3
21 "		1	.1	.1	.2	.2	.2	.3	.3	.4
22 "		1	.1	.1	.2	.2	.3	.3	.3	.4
23 "		1	.1	.2	.2	.2	.3	.3	.3	.4
24 "		1	.1	.2	.2	.2	.3	.3	.4	.4
25 "		1	.1	.2	.2	.3	.3	.3	.4	.4
26 "		1	.1	.2	.2	.3	.3	.3	.4	.4
27 "		1	.1	.2	.2	.3	.3	.4	.4	.5
28 "		1	.1	.2	.2	.3	.3	.4	.4	.5
29 "		1	.1	.2	.2	.3	.3	.4	.4	.5
1 Month	.1	.1	.2	.2	.3	.3	.4	.4	.5	.5
2 "	.1	.2	.3	.4	.5	.6	.7	.8	.9	.10
3 "	.2	.3	.5	.6	.8	.9	.11	.12	.14	.15
4 "	.2	.4	.6	.8	.10	.12	.14	.16	.18	.20
5 "	.3	.5	.8	.10	.13	.15	.18	.20	.23	.25
6 "	.3	.6	.9	.12	.15	.18	.21	.24	.27	.30
7 "	.4	.7	.11	.14	.18	.21	.25	.28	.32	.35
8 "	.4	.8	.12	.16	.20	.24	.28	.32	.36	.40
9 "	.5	.9	.14	.18	.23	.27	.32	.36	.41	.45
10 "	.5	.10	.15	.20	.25	.30	.35	.40	.45	.50
11 "	.6	.11	.17	.22	.28	.33	.39	.44	.50	.55
1 Year.	.6	.12	.18	.24	.30	.36	.42	.48	.54	.60

INTEREST TABLE AT 6 PER CENT.

Time.	*$20*	*$30*	*$40*	*$50*	*$60*	*$70*	*$80*	*$90*	*$100*	*$1,000*
1 Day.		.1	.1	.1	.1	.1	.1	.2	.2	.17
2 "	.1	.1	.1	.2	.2	.2	.3	.3	.3	.33
3 "	.1	.2	.2	.3	.3	.4	.4	.5	.5	.50
4 "	.1	.2	.3	.3	.4	.5	.5	.6	.7	.67
5 "	.2	.3	.3	.4	.5	.6	.7	.8	.8	.83
6 "	.2	.3	.4	.5	.6	.7	.8	.9	.10	1.00
7 "	.2	.4	.5	.6	.7	.8	.9	.11	.12	1.17
8 "	.3	.4	.5	.7	.8	.9	.11	.12	.13	1.33
9 "	.3	.5	.6	.8	.9	.11	.12	.14	.15	1.50
10 "	.3	.5	.7	.8	.10	.12	.13	.15	.17	1.67
11 "	.4	.6	.7	.9	.11	.13	.15	.17	.18	1.83
12 "	.4	.6	.8	.10	.12	.14	.16	.18	.20	2.00
13 "	.4	.7	.9	.11	.13	.15	.17	.20	.22	2.17
14 "	.5	.7	.9	.12	.14	.16	.19	.21	.23	2.33
15 "	.5	.8	.10	.13	.15	.18	.20	.23	.25	2.50
16 "	.5	.8	.11	.13	.16	.19	.21	.24	.27	2.67
17 "	.6	.9	.11	.14	.17	.20	.23	.26	.28	2.83
18 "	.6	.9	.12	.15	.18	.21	.24	.27	.30	3.00
19 "	.6	.10	.13	.16	.19	.22	.25	.29	.32	3.17
20 "	.7	.10	.13	.17	.20	.23	.27	.30	.33	3.33
21 "	.7	.11	.14	.18	.21	.25	.28	.32	.35	3.50
22 "	.7	.11	.15	.18	.22	.26	.29	.33	.37	3.67
23 "	.8	.12	.15	.19	.23	.27	.31	.35	.38	3.83
24 "	.8	.12	.16	.20	.24	.28	.32	.36	.40	4.00
25 "	.8	.13	.17	.21	.25	.29	.33	.38	.42	4.17
26 "	.9	.13	.17	.22	.26	.30	.35	.39	.43	4.33
27 "	.9	.14	.18	.23	.27	.32	.36	.41	.45	4.50
28 "	.9	.14	.19	.23	.28	.33	.37	.42	.47	4.67
29 "	.10	.15	.19	.24	.29	.34	.39	.44	.48	4.83
1 Month	.10	.15	.20	.25	.30	.35	.40	.45	.50	5.00
2 "	.20	.30	.40	.50	.60	.70	.80	.90	1.00	10.00
3 "	.30	.45	.60	.75	.90	1.05	1.20	1.35	1.50	15.00
4 "	.40	.60	.80	1.00	1.20	1.40	1.60	1.80	2.00	20.00
5 "	.50	.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	25.00
6 "	.60	.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	30.00
7 "	.70	1.05	1.40	1.75	2.10	2.45	2.80	3.15	3.50	35.00
8 "	.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60	4.00	40.00
9 "	.90	1.35	1.80	2.25	2.70	3.15	3.60	4.05	4.50	45.00
10 "	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	50.00
11 "	1.10	1.65	2.20	2.75	3.30	3.85	4.40	4.95	5.50	55.00
1 Year.	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	6.00	60.00

INTEREST TABLE AT 7 PER CENT.

Time.	*$1*	*$2*	*$3*	*$4*	*$5*	*$6*	*$7*	*$8*	*$9*	*$10*
1 Day.										
2 "										
3 "									.1	.1
4 "							.1	.1	.1	.1
5 "						.1	.1	.1	.1	.1
6 "					.1	.1	.1	.1	.1	.1
7 "				.1	.1	.1	.1	.1	.1	.1
8 "				.1	.1	.1	.1	.1	.1	.2
9 "			.1	.1	.1	.1	.1	.1	.2	.2
10 "			.1	.1	.1	.1	.1	.2	.2	.2
11 "			.1	.1	.1	.1	.1	.2	.2	.2
12 "			.1	.1	.1	.1	.2	.2	.2	.2
13 "		.1	.1	.1	.1	.2	.2	.2	.2	.3
14 "		.1	.1	.1	.1	.2	.2	.2	.2	.3
15 "		.1	.1	.1	.1	.2	.2	.2	.3	.3
16 "		.1	.1	.1	.2	.2	.2	.2	.3	.3
17 "		.1	.1	.1	.2	.2	.2	.3	.3	.3
18 "		.1	.1	.1	.2	.2	.2	.3	.3	.4
19 "		.1	.1	.1	.2	.2	.3	.3	.3	.4
20 "		.1	.1	.2	.2	.2	.3	.3	.4	.4
21 "		.1	.1	.2	.2	.2	.3	.3	.4	.4
22 "		.1	.1	.2	.2	.3	.3	.3	.4	.4
23 "		.1	.1	.2	.2	.3	.3	.4	.4	.4
24 "		.1	.1	.2	.2	.3	.3	.4	.4	.5
25 "		.1	.1	.2	.2	.3	.3	.4	.4	.5
26 "	.1	.1	.2	.2	.3	.3	.4	.4	.5	.5
27 "	.1	.1	.2	.2	.3	.3	.4	.4	.5	.5
28 "	.1	.1	.2	.2	.3	.3	.4	.4	.5	.5
29 "	.1	.1	.2	.2	.3	.3	.4	.5	.5	.6
1 Month	.1	.1	.2	.2	.3	.4	.4	.5	.5	.6
2 "	.1	.2	.4	.5	.6	.7	.8	.9	.11	.12
3 "	.2	.4	.5	.7	.9	.11	.12	.14	.16	.18
4 "	.2	.5	.7	.9	.12	.14	.16	.19	.21	.23
5 "	.3	.6	.9	.12	.15	.18	.20	.23	.26	.29
6 "	.4	.7	.11	.14	.18	.21	.25	.28	.32	.35
7 "	.4	.8	.12	.16	.20	.25	.29	.33	.37	.41
8 "	.5	.9	.14	.19	.23	.28	.33	.37	.42	.47
9 "	.5	.11	.16	.21	.26	.32	.37	.42	.47	.53
10 "	.6	.12	.18	.23	.29	.35	.41	.47	.53	.58
11 "	.6	.13	.19	.26	.32	.39	.45	.51	.58	.64
1 Year.	.7	.14	.21	.28	.35	.42	.49	.56	.63	.70

INTEREST TABLE AT 7 PER CENT.

Time.	*$20*	*$30*	*$40*	*$50*	*$60*	*$70*	*$80*	*$90*	*$100*	*$1,000*
1 Day.		.1	.1	.1	.1	.1	.2	.2	.2	.19
2 "	.1	.1	.2	.2	.2	.3	.3	.4	.4	.39
3 "	.1	.2	.2	.3	.4	.4	.5	.5	.6	.58
4 "	.2	.2	.3	.4	.5	.5	.6	.7	.8	.78
5 "	.2	.3	.4	.5	.6	.7	.8	.9	.10	.97
6 "	.2	.4	.5	.6	.7	.8	.9	.11	.12	1.17
7 "	.3	.4	.5	.7	.8	.10	.11	.12	.14	1.36
8 "	.3	.5	.6	.8	.9	.11	.12	.14	.16	1.56
9 "	.4	.5	.7	.9	.11	.12	.14	.16	.18	1.75
10 "	.4	.6	.8	.10	.12	.14	.16	.18	.19	1.94
11 "	.4	.6	.9	.11	.13	.15	.17	.19	.21	2.14
12 "	.5	.7	.9	.12	.14	.16	.19	.21	.23	2.33
13 "	.5	.8	.10	.13	.15	.18	.20	.23	.25	2.53
14 "	.5	.8	.11	.14	.16	.19	.22	.25	.27	2.72
15 "	.6	.9	.12	.15	.18	.20	.23	.26	.29	2.92
16 "	.6	.9	.12	.16	.19	.22	.25	.28	.31	3.11
17 "	.7	.10	.13	.17	.20	.23	.26	.30	.33	3.31
18 "	.7	.11	.14	.18	.21	.25	.28	.32	.35	3.50
19 "	.7	.11	.15	.18	.22	.26	.30	.33	.37	3.69
20 "	.8	.12	.16	.19	.23	.27	.31	.35	.39	3.89
21 "	.8	.12	.16	.20	.25	.29	.33	.37	.41	4.08
22 "	.9	.13	.17	.21	.26	.30	.34	.39	.43	4.28
23 "	.9	.13	.18	.22	.27	.31	.36	.40	.45	4.47
24 "	.9	.14	.19	.23	.28	.33	.37	.42	.47	4.67
25 "	.10	.15	.19	.24	.29	.34	.39	.44	.49	4.86
26 "	.10	.15	.20	.25	.30	.35	.40	.46	.51	5.06
27 "	.11	.16	.21	.26	.32	.37	.42	.47	.53	5.25
28 "	.11	.16	.22	.27	.33	.38	.44	.49	.54	5.44
29 "	.11	.17	.23	.28	.34	.39	.45	.51	.56	5.64
1 Month	.12	.18	.23	.29	.35	.41	.47	.53	.58	5.83
2 "	.23	.35	.47	.58	.70	.82	.93	1.05	1.17	11.67
3 "	.35	.53	.70	.88	1.05	1.23	1.40	1.58	1.75	17.50
4 "	.47	.70	.93	1.17	1.40	1.63	1.87	2.10	2.33	23.33
5 "	.58	.88	1.17	1.46	1.75	2.04	2.33	2.63	2.92	29.17
6 "	.70	1.05	1.40	1.75	2.10	2.45	2.80	3.15	3.50	35.00
7 "	.82	1.23	1.63	2.04	2.45	2.86	3.27	3.68	4.08	40.83
8 "	.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	46.67
9 "	1.05	1.58	2.10	2.63	3.15	3.68	4.20	4.73	5.25	52.50
10 "	1.17	1.75	2.33	2.92	3.50	4.08	4.67	5.25	5.83	58.33
11 "	1.28	1.93	2.57	3.21	3.85	4.49	5.13	5.78	6.42	64.17
1 Year.	1.40	2.10	2.80	3.50	4.20	4.90	5.60	6.30	7.00	70.00

INTEREST TABLE AT 8 PER CENT.

Time.	*$1*	*$2*	*$3*	*$4*	*$5*	*$6*	*$7*	*$8*	*$9*	*$10*
1 Day.										
2 "										
3 "								.1	.1	.1
4 "						.1	.1	.1	.1	.1
5 "					.1	.1	.1	.1	.1	.1
6 "				.1	.1	.1	.1	.1	.1	.1
7 "				.1	.1	.1	.1	.1	.1	.2
8 "			.1	.1	.1	.1	.1	.1	.2	.2
9 "			.1	.1	.1	.1	.1	.2	.2	.2
10 "			.1	.1	.1	.1	.2	.2	.2	.2
11 "			.1	.1	.1	.1	.2	.2	.2	.2
12 "		.1	.1	.1	.1	.2	.2	.2	.2	.3
13 "		.1	.1	.1	.1	.2	.2	.2	.3	.3
14 "		.1	.1	.1	.2	.2	.2	.2	.3	.3
15 "		.1	.1	.1	.2	.2	.2	.3	.3	.3
16 "		.1	.1	.1	.2	.2	.2	.3	.3	.4
17 "		.1	.1	.2	.2	.2	.3	.3	.3	.4
18 "		.1	.1	.2	.2	.2	.3	.3	.4	.4
19 "		.1	.1	.2	.2	.3	.3	.3	.4	.4
20 "		.1	.1	.2	.2	.3	.3	.4	.4	.4
21 "		.1	.1	.2	.2	.3	.3	.4	.4	.5
22 "		.1	.1	.2	.2	.3	.3	.4	.4	.5
23 "	.1	.1	.2	.2	.3	.3	.4	.4	.5	.5
24 "	.1	.1	.2	.2	.3	.3	.4	.4	.5	.5
25 "	.1	.1	.2	.2	.3	.3	.4	.4	.5	.6
26 "	.1	.1	.2	.2	.3	.3	.4	.5	.5	.6
27 "	.1	.1	.2	.2	.3	.4	.4	.5	.5	.6
28 "	.1	.1	.2	.2	.3	.4	.4	.5	.6	.6
29 "	.1	.1	.2	.3	.3	.4	.5	.5	.6	.6
1 Month	.1	.1	.2	.3	.3	.4	.5	.5	.6	.7
2 "	.1	.3	.4	.5	.7	.8	.9	.11	.12	.13
3 "	.2	.4	.6	.8	.10	.12	.14	.16	.18	.20
4 "	.3	.5	.8	.11	.13	.16	.19	.21	.24	.27
5 "	.3	.7	.10	.13	.17	.20	.23	.27	.30	.33
6 "	.4	.8	.12	.16	.20	.24	.28	.32	.36	.40
7 "	.5	.9	.14	.19	.23	.28	.33	.37	.42	.47
8 "	.5	.11	.16	.21	.27	.32	.37	.43	.48	.53
9 "	.6	.12	.18	.24	.30	.36	.42	.48	.54	.60
10 "	.7	.13	.20	.27	.33	.40	.47	.53	.60	.67
11 "	.7	.15	.22	.29	.37	.44	.51	.59	.66	.73
1 Year.	.8	.16	.24	.32	.40	.48	.56	.64	.72	.80

INTEREST TABLE AT 8 PER CENT.

Time.	*$20*	*$30*	*$40*	*$50*	*$60*	*$70*	*$80*	*$90*	*$100*	*$1,000*
1 Day.		.1	.1	.1	.1	.2	.2	.2	.2	.22
2 "	.1	.1	.2	.2	.3	.3	.4	.4	.4	.44
3 "	.1	.2	.3	.3	.4	.5	.5	.6	.7	.67
4 "	.2	.3	.4	.4	.5	.6	.7	.8	.9	.89
5 "	.2	.3	.4	.6	.7	.8	.9	.10	.11	1.11
6 "	.3	.4	.5	.7	.8	.9	.11	.12	.13	1.33
7 "	.3	.5	.6	.8	.9	.11	.12	.14	.16	1.56
8 "	.4	.5	.7	.9	.11	.12	.14	.16	.18	1.78
9 "	.4	.6	.8	.10	.12	.14	.16	.18	.20	2.00
10 "	.4	.7	.9	.11	.13	.16	.18	.20	.22	2.22
11 "	.5	.7	.10	.12	.15	.17	.20	.22	.24	2.44
12 "	.5	.8	.11	.13	.16	.19	.21	.24	.27	2.67
13 "	.6	.9	.12	.14	.17	.20	.23	.26	.29	2.89
14 "	.6	.9	.12	.16	.19	.22	.25	.28	.31	3.11
15 "	.7	.10	.13	.17	.20	.23	.27	.30	.33	3.33
16 "	.7	.11	.14	.18	.21	.25	.28	.32	.36	3.56
17 "	.8	.11	.15	.19	.23	.26	.30	.34	.38	3.78
18 "	.8	.12	.16	.20	.24	.28	.32	.36	.40	4.00
19 "	.8	.13	.17	.21	.25	.30	.34	.38	.42	4.22
20 "	.9	.13	.18	.22	.27	.31	.36	.40	.44	4.44
21 "	.9	.14	.19	.23	.28	.33	.37	.42	.47	4.67
22 "	.10	.15	.20	.24	.29	.34	.39	.44	.49	4.89
23 "	.10	.15	.20	.26	.31	.36	.41	.46	.51	5.11
24 "	.11	.16	.21	.27	.32	.37	.43	.48	.53	5.33
25 "	.11	.17	.22	.28	.33	.39	.44	.50	.56	5.56
26 "	.12	.17	.23	.29	.35	.40	.46	.52	.58	5.78
27 "	.12	.18	.24	.30	.36	.42	.48	.54	.60	6.00
28 "	.12	.19	.25	.31	.37	.44	.50	.56	.62	6.22
29 "	.13	.19	.26	.32	.39	.45	.52	.58	.64	6.44
1 Month	.13	.20	.27	.33	.40	.47	.53	.60	.67	6.67
2 "	.27	.40	.53	.67	.80	.93	1.07	1.20	1.33	13.33
3 "	.40	.60	.80	1.00	1.20	1.40	1.60	1.80	2.00	20.00
4 "	.53	.80	1.07	1.33	1.60	1.87	2.13	2.40	2.67	26.67
5 "	.67	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	33.33
6 "	.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60	4.00	40.00
7 "	.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	46.67
8 "	1.07	1.60	2.13	2.67	3.20	3.73	4.27	4.80	5.33	53.33
9 "	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	6.00	60.00
10 "	1.33	2.00	2.67	3.33	4.00	4.67	5.33	6.00	6.67	66.67
11 "	1.47	2.20	2.93	3.67	4.40	5.13	5.87	6.60	7.33	73.33
1 Year.	1.60	2.40	3.20	4.00	4.80	5.60	6.40	7.20	8.00	80.00

INTEREST TABLE AT 10 PER CENT.

Time.	*$1*	*$2*	*$3*	*$4*	*$5*	*$6*	*$7*	*$8*	*$9*	*$10*
1 Day.										
2 "									.1	.1
3 "						.1	.1	.1	.1	.1
4 "					.1	.1	.1	.1	.1	.1
5 "				.1	.1	.1	.1	.1	.1	.1
6 "			.1	.1	.1	.1	.1	.1	.2	.2
7 "			.1	.1	.1	.1	.1	.2	.2	.2
8 "			.1	.1	.1	.1	.2	.2	.2	.2
9 "		.1	.1	.1	.1	.2	.2	.2	.2	.3
10 "		.1	.1	.1	.1	.2	.2	.2	.3	.3
11 "		.1	.1	.1	.2	.2	.2	.2	.3	.3
12 "		.1	.1	.1	.2	.2	.2	.3	.3	.3
13 "		.1	.1	.1	.2	.2	.3	.3	.3	.4
14 "		.1	.1	.2	.2	.2	.3	.3	.4	.4
15 "		.1	.1	.2	.2	.3	.3	.3	.4	.4
16 "		.1	.1	.2	.2	.3	.3	.4	.4	.4
17 "		.1	.1	.2	.2	.3	.3	.4	.4	.5
18 "	.1	.1	.2	.2	.3	.3	.4	.4	.5	.5
19 "	.1	.1	.2	.2	.3	.3	.4	.4	.5	.5
20 "	.1	.1	.2	.2	.3	.3	.4	.4	.5	.6
21 "	.1	.1	.2	.2	.3	.4	.4	.5	.5	.6
22 "	.1	.1	.2	.2	.3	.4	.4	.5	.6	.6
23 "	.1	.1	.2	.3	.3	.4	.4	.5	.6	.6
24 "	.1	.1	.2	.3	.3	.4	.5	.5	.6	.7
25 "	.1	.1	.2	.3	.3	.4	.5	.6	.6	.7
26 "	.1	.1	.2	.3	.4	.4	.5	.6	.7	.7
27 "	.1	.2	.2	.3	.4	.5	.5	.6	.7	.8
28 "	.1	.2	.2	.3	.4	.5	.5	.6	.7	.8
29 "	.1	.2	.2	.3	.4	.5	.6	.6	.7	.8
1 Month	.1	.2	.3	.3	.4	.5	.6	.7	.8	.8
2 "	.2	.3	.5	.7	.8	.10	.12	.13	.15	.17
3 "	.3	.5	.8	.10	.13	.15	.18	.20	.23	.25
4 "	.3	.7	.10	.13	.17	.20	.23	.27	.30	.33
5 "	.4	.8	.13	.17	.21	.25	.29	.33	.38	.42
6 "	.5	.10	.15	.20	.25	.30	.35	.40	.45	.50
7 "	.6	.12	.18	.23	.29	.35	.41	.47	.53	.58
8 "	.7	.13	.20	.27	.33	.40	.47	.53	.60	.67
9 "	.8	.15	.23	.30	.38	.45	.53	.60	.68	.75
10 "	.8	.17	.25	.33	.42	.50	.58	.67	.75	.83
11 "	.9	.18	.28	.37	.46	.55	.64	.73	.83	.92
1 Year.	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00

INTEREST TABLE AT 10 PER CENT.

Time.	*$20*	*$30*	*$40*	*$50*	*$60*	*$70*	*$80*	*$90*	*$100*	*$1,000*
1 Day.	.1	.1	.1	.1	.2	.2	.2	.3	.3	.28
2 "	.1	.2	.2	.3	.3	.4	.4	.5	.6	.56
3 "	.2	.3	.3	.4	.5	.6	.7	.8	.8	.83
4 "	.2	.3	.4	.6	.7	.8	.9	.10	.11	1.11
5 "	.3	.4	.6	.7	.8	.10	.11	.13	.14	1.39
6 "	.3	.5	.7	.8	.10	.12	.13	.15	.17	1.67
7 "	.4	.6	.8	.10	.12	.14	.16	.18	.19	1.94
8 "	.4	.7	.9	.11	.13	.16	.18	.20	.22	2.22
9 "	.5	.8	.10	.13	.15	.18	.20	.23	.25	2.50
10 "	.6	.8	.11	.14	.17	.19	.22	.25	.28	2.78
11 "	.6	.9	.12	.15	.18	.21	.24	.28	.31	3.06
12 "	.7	.10	.13	.17	.20	.23	.27	.30	.33	3.33
13 "	.7	.11	.14	.18	.22	.25	.29	.33	.36	3.61
14 "	.8	.12	.16	.19	.23	.27	.31	.35	.39	3.89
15 "	.8	.13	.17	.21	.25	.29	.33	.38	.42	4.17
16 "	.9	.13	.18	.22	.27	.31	.36	.40	.44	4.44
17 "	.9	.14	.19	.24	.28	.33	.38	.43	.47	4.72
18 "	.10	.15	.20	.25	.30	.35	.40	.45	.50	5.00
19 "	.11	.16	.21	.26	.32	.37	.42	.48	.53	5.28
20 "	.11	.17	.22	.28	.33	.39	.44	.50	.56	5.56
21 "	.12	.18	.23	.29	.35	.41	.49	.53	.58	5.83
22 "	.12	.18	.24	.31	.37	.43	.49	.55	.61	6.11
23 "	.13	.19	.26	.32	.38	.45	.51	.58	.64	6.39
24 "	.13	.20	.27	.33	.40	.47	.53	.60	.67	6.67
25 "	.14	.21	.28	.35	.42	.49	.56	.63	.69	6.94
26 "	.14	.22	.29	.36	.43	.51	.58	.65	.72	7.22
27 "	.15	.23	.30	.38	.45	.53	.60	.68	.75	7.50
28 "	.16	.23	.31	.39	.47	.54	.62	.70	.78	7.78
29 "	.16	.24	.32	.40	.48	.56	.64	.73	.81	8.06
1 Month	.17	.25	.33	.42	.50	.58	.67	.75	.83	8.33
2 "	.33	.50	.67	.83	1.00	1.17	1.33	1.50	1.67	16.67
3 "	.50	.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	25.00
4 "	.67	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	33.33
5 "	.83	1.25	1.67	2.08	2.50	2.92	3.33	3.75	4.17	41.67
6 "	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	50.00
7 "	1.17	1.75	2.33	2.92	3.50	4.08	4.67	5.25	5.83	58.33
8 "	1.33	2.00	2.67	3.33	4.00	4.67	5.33	6.00	6.67	66.67
9 "	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	75.00
10 "	1.67	2.50	3.33	4.17	5.00	5.83	6.67	7.50	8.33	83.33
11 "	1.83	2.75	3.67	4.58	5.50	6.42	7.33	8.25	9.17	91.67
1 Year.	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	100.00

AGRICULTURAL CHEMISTRY.

Every form of material wealth is determined by the amount and quality of natural productions, and depends therefore upon agriculture and mining. It is then of the first importance to the entire community that these should be conducted with as great a degree of skill and judgment as possible, and that the farmer or the miner should bring to his work the greatest possible knowledge of his profession.

A correct appreciation of the various problems of agriculture (and of mining as well) requires not only a wide experience and clear judgment, but also a correct understanding of certain scientific principles which underlie them. Thus the farmer, to farm properly, should act with intelligent insight into the various processes connected with the growth of plants, and should possess a certain acquaintance with the sciences of Geology, Chemistry, Botany, Vegetable and Animal Physiology, etc., just so far as these affect his vocation.

The chemistry of farming is one of the most intricate branches of that science, since it involves many obscure processes of vegetable life. Many eminent investigators, however, some working in the laboratory and others in the field or garden, have by their combined efforts succeeded in establishing certain principles, which in their proper application have proved to be of great value.

THE SOIL.—Soil consists of a variety of substances differing greatly in different regions, sometimes having many, sometimes but few constituents. In all cases, however, a soil which will support vegetation has in it two kinds of material—one of mineral character, the other derived from decayed animal or vegetable matter.

If a portion of an animal or vegetable be examined, it will be found to have a peculiar structure of cells, pores, tissues, etc., to possess organs which were essential to the life of the being of which it was once a part; it is therefore called organic, and is known as such no matter how much decayed it may be. All unorganized substances or those derived from minerals are termed inorganic: they are of a more permanent character, not subject to decay, and generally tend to assume more or less regular crystalline forms.

Some organic substances resemble the inorganic or minerals in this

definiteness of shape and permanency, form crystals, and are not liable of themselves to decay, such as sugar, citric acid, urea, tartaric acid, etc.; and others again which are gelatinous, or fibrous in their structure, decay readily and seem to possess a more complex composition, as woody fibre, cellulose, etc. This last class is called organized to distinguish it from the former, but in this article the term *organic* is used to include them both.

The soil and the plant growing upon it possess all of these forms of matter, inorganic, organic and organized, in varying proportions. A good soil has from 2 to 25 per cent of organic, and from 75 to 98 per cent of inorganic matter; a plant on the contrary contains from 80 to 99 1-2 per cent organic, and only from one-half to 20 per cent of inorganic matter. From both plants and soils the organic substances may be burned out, leaving the mineral or ash behind.

Although the ash of plants is relatively so small a proportion, it is very important to their life, and they will not grow where proper material for forming this is wanting.

ORIGIN AND NATURE OF SOILS.—The crust of the earth is rock, and by the action of the sun, rain, heat, frost and the air, this has been on its surfaces reduced to a powder more or less fine. This powdered rock either lying where it was originally made or washed down to lower levels and spread out in layers constitutes the mineral portion of the soils. From the variety of rocks it would seem that soils would vary in a corresponding manner; such indeed is the case, and the sudden change in its character within very short distances is often to be explained by a corresponding change in the underlying rocks.

For example, Granite, Gneiss, Slate, etc., being hard and slow in decomposing form thin soils generally poor.

2. *Shales* and softer slates form stiff, adhesive clays, difficult to work and requiring high farming to be profitable.

3. Hard limestone (dolomite) forms a thin, unproductive soil, but that above impure limestone and marls is often quite fertile.

PROPERTIES OF SOIL.—The value of a soil depends upon a variety of properties, and would differ greatly under changed conditions of climate, rainfall or slope; but in any given district where these are essentially the same, differences in production are due to variation in quality. These properties are of two kinds, first, physical; and, second, chemical.

The chief physical properties of the soil are, first, their weight, density or specific gravity; second, their capacity for taking and retain-

ing moisture; third, their expansion and contraction; and fourth, their ability to absorb and retain heat.

1. In respect to density they vary greatly; dry peaty soils weigh the least and sandy ones the most; stiff clay when dry is only about four-fifths as heavy as sand. Density is a property of much practical importance, and when it is too little may frequently be improved by rolling or treading with cattle; a dressing of sand or clay is often of much value.

2. Stiff clays and peaty earth absorb nearly three times as much water as sand, and for this reason, while usually wet and cold, in periods of drouth afford abundant pasture. In wet seasons plants thrive better on sandy soils. Clays and peat also raise water by capillary action from the subsoil to the plant roots more readily and for a greater distance than sand will do, and give it off to the air in evaporation only one-third as fast.

3. In drying, soil shrinks in proportion to the amount of clay or peat it contains, as these diminish in bulk nearly one-fifth, compressing and injuring the roots and excluding the air from them, while sand shrinks scarcely at all.

4. The ability of the soil to take and retain heat has a great influence upon vegetation. In the neighborhood of volcanoes it is usually very luxuriant owing to the natural interior warmth. Generally, however, this is derived only from the sun, but the temperature attained by different soils varies considerably, and is often much higher than that of the atmosphere. When in the air the thermometer indicates only 60° or 70° in the shade, a dry soil may reach 90° or 100°. In certain countries, as in Central Australia and Lower California, etc., the ground sometimes gets hot enough to set fire to matches falling upon it. Wet soils warm and cool less readily than dry ones, and owing to evaporation rarely reach so high a temperature by 10° or 15°; they are therefore rightly called *cold*, and may be improved in this as in many other respects by drainage.

From the effects of this physical structure, it is evident that the most desirable soils are those which contain a proper proportion of sand and clay, and in reclaiming unprofitable land success depends largely upon the judgment exercised in changing or modifying its physical properties. Clay and peat are singularly alike in these particulars, both differing greatly from sand and may generally be profitably mixed with it, but not as a rule with each other unless it be done for the sake of their different chemical ingredients.

Besides furnishing a porous medium in which the roots of plants may extend to support the stalk, and regulating the amount of temperature and of moisture by reason of the physical properties just mentioned, the soil is a source of supply to the plant, furnishing it food at each period of its growth, and is also a medium in which many chemical operations are carried on in preparing this food.

Since it is the farmer's object to raise the greatest possible products from a given amount of land with the least cost and permanent injury to it, it is especially useful for him to understand as thoroughly as possible the needs of the various crops in regard to temperature, moisture, food, etc., the nature of the operations which must supply these requirements, and the special capacity of any given piece of land. When he is able to determine these things for himself he will be able to farm most intelligently, easily and economically; to devise new and perhaps unsuspected means of fertilizing soil now of little value, and of protecting good land from the barrenness which unwise cultivation is sure sooner or later to bring about.

CHEMICAL COMPOSITION.—All substances, inorganic, organic and organized, however great their variety, are composed of certain simple substances called elements. Thus marble or limestone for example, by heating can be separated into a white chalky substance familiarly known as *lime,* and a colorless gas commonly known as *carbonic acid gas* (more correctly *carbonic oxide*); by proper methods of analysis again the lime may be separated into a yellowish white metal called *calcium* and a colorless gas, *oxygen,* while the *carbonic oxide* may be also divided into oxygen and *carbon* (a black solid commonly known in the form of charcoal or lampblack); thus it seems that marble or limestone is composed of three different materials, which are called elements because they cannot be further divided by any known methods of analysis.

Although the different forms and kinds of matter are so numerous, yet the elements of which they are compounded are relatively few, about sixty-three only being known. Of these many are very rare, being of interest mainly to the chemist; others again are very abundant, *e.g.*, *oxygen,* which enters into the composition of the great majority of all known substances. A list of the most important elements is given below, together with the symbol or abbreviation of each.

1. Aluminum, Al.
2. *Antimony*, Sb.
3. *Arsenic*, As.
4. Barium, Ba.
5. Bismuth, Bi.
6. *Bromine*, Br.
7. Calcium, Ca.
8. *Carbon*, C.
9. *Chlorine*, Cl.
10. *Chromium*, Cr.
11. Cobalt, Co.
12. Copper, Cu.
13. Gold, Au.
14. Hydrogen, H.
15. *Iodine*, I.
16. Iron, Fe.
17. Lead, Pb.
18. Magnesium, Mg.
19. Manganese, Mn.
20. Mercury Hg.
21. Nickel, Ni.
22. *Nitrogen*, N.
23. *Oxygen*, O.
24. *Phosphorus*, P.
25. Potassium, K.
26. *Silicon*, Si.
27. Silver, Ag.
28. Sodium, Na
29. *Sulphur*, S.
30. Tin, Sn.
31. Zinc, Zn.

These elements have the power of uniting chemically with one another to form compounds whose nature may be entirely different from their constitutents: thus, *hydrogen* and *oxygen*, both gases, unite and form water, a liquid possessing properties entirely distinct from its elements. *Carbon* (charcoal) and *oxygen* form a colorless gas *carbonic oxide; sodium*, a soft silvery-white metal, and *chlorine*, a yellow, pungent gas, each by itself a corrosive poison, unite and form common salt, *sodium chloride.*

It must be clearly understood that chemical combination is entirely distinct from the intermixing of different substances, and that the properties of a chemical compound are peculiar to itself, and often do not appear to resemble in the least those of its component elements: thus, *sulphur* and *carbon* (charcoal) may be pulverized and mixed intimately, but under ordinary circumstances no chemical union occurs, the microscope will reveal the black and yellow grains lying side by side; but if properly treated the two combine to form a highly volatile liquid of pungent, disagreeable odor, very useful to chemists, and known as *carbon disulphide.*

Oxygen is by far the most abundant element, composing by weight one-fifth of the air, eight-ninths of water, and more than one-half of the known rocks. It unites with all other elements except one to form compounds which are called *oxides.* Some elements, by uniting with this one in varying proportions, form several oxides of different character. Oxides are therefore exceedingly numerous and important, and especially so because they have again the power of combining with one another.

To make this clear it will be necessary to explain the *positive* and *negative* nature of the various elements and compounds.

As a rule the metals and their oxides are considered positive—that is to say they have a *basic* or *non-acid* character, if their are soluble their taste is more or less bitter or caustic; they have a *strong affinity for non-metallic or negative elements or oxides, but not for one another.* In the list of elements the positive ones are printed in capitals. The *non-metallic* elements and oxides are negative; they have an *acid* character; if soluble are sour, sometimes even when highly diluted; they have a strong affinity for *positive* elements or oxides, but not for one another. In the list of elements, those which are negative are printed in italics. These positive and negative elements and oxides unite and form a class of compounds which are called salts. In naming these the termination *ide* indicates a direct union of elements, the termination *ate* or *ite*, a union of oxides. *e.g.:*

Sodium sulphide, formed of sodium and sulphur;

Silver chloride, formed of silver and chlorine;

Sulphate of iron, formed of iron oxide and sulphuric oxide;

Silicate of lime, formed of calcium oxide and silicic oxide;

Nitrate of potash (saltpetre), formed of potassium oxide and nitric oxide, etc.

The positive and negative elements differ also among themselves in degree, or energy of combining force. Thus sulphur, chlorine, etc., and their oxides, are powerful negatives, while carbon, arsenic, etc., and their oxides, are much weaker. Among positives also, potassium, sodium, calcium, etc., are powerful positives, while iron, aluminum, copper, etc., are weaker.

Hydrogen and its oxide, water, seems to occupy a neutral position, being weakly positive towards negative substances or weakly negative toward those which are positive.

It is necessary to see clearly these relations of matter in order to understand how it is that they act on one another. The law of their attraction for each other may be stated as being *in proportion to their difference in character.* All positive substances prefer a strong negative, but the more powerful positive will displace the weaker positive. Strong negatives also will take from a weaker negative a strong positive which the latter may possess. For example, hydrogen sulphate (sulphuric acid) or hydrogen chloride (muriatic acid), if thrown upon calcium carbonate (limestone), will give up their weak positives (hydrogen oxide or hydrogen) and take the strong positive calcium, and will form with it calcium sulphate or calcium chloride, while the weak negative, carbonic oxide,

driven out of the combination, escapes in gaseous bubbles, making the liquid effervesce.

In addition to these inorganic *basic* and *acid* substances and their compounds or *salts* there are others of organic origin whose composition is too intricate to be explained here. Their action, however, is important, and similar to that just explained. One of them may be mentioned as being of special importance, ammonia, a powerful base, like potassium or sodium; the others of interest are mainly of a negative or acid character, and shall be referred to as such.

The soil is a laboratory in which many chemical operations are constantly carried on. The inorganic substances derived from the rocks, water, and air, and the organic matters from decaying forms of life intermingle and react upon one another to prepare food for the growing plants whose roots extend in all directions seeking it.

CHEMICAL NATURE OF SOIL.—Soils are formed from the stratified or the unstratified rocks; and since stratified rocks were derived from those which were unstratified or igneous, from these ultimately or immediately all soils have come.

These primitive rocks may be conveniently divided into, first, Granites, including Gneiss, Schist, etc.; and, second, Trap-rocks; including Basalt, Porphyry, Lava, etc.

1. Granite is composed chiefly of quartz (or silica), which, when decomposed forms sand, and felspar, the basis of clay. The mica in granite is not generally present in sufficient amount to affect the quality of the resulting soil.

2. Trap-rocks are composed chiefly of felspar and hornblende, the latter a dark brown, or blackish crystalline mineral containing a variety of constituents.

Since quartz or sand is highly insoluble, and since soil is chemically valuable mainly for the soluble food which can be made out of it, it is evident that granite soils depend entirely for such value upon felspar, while trap-soil contains both felspar and hornblende. A comparison of the chemical composition of these is interesting:

	Felspar.	Hornblende.
Silica (quartz)	66.7	40.
Alumina	17.6	14.1
Potash and soda	14.3	4.5
Lime (calcium oxide)	Trace	12.2
Magnesia (magnisium oxide)	Trace	13.4
Oxides of Iron	.02	16.3
Oxide of Manganese	Trace	.3

a. In this is found a hint of the generally unproductive nature of granite soils and of the fertility of those formed from trap.

b. The addition of lime, iron, etc., to the former is of value, but not so in the latter case, since they already contain an abundance.

c. The addition of decayed trap-rocks, sometimes called marl or rotten rock, is often beneficial.

d. When trap-soils are first broken they may be benefited by the application of lime, but as cultivation turns up the subsoil, this, treatment is no longer of any use,—the original lime having settled a little below the surface.

Below is given an analysis of a fertile wheat soil and subsoil:

	Soil.	Subsoil.
Silica	61.20	61.63
Oxides of Iron	4.87	6.24
Alumina	14.04	14.25
Lime	.83	1.27
Magnesia	1.02	1.37
Potash	2.80	2.17
Soda	1.44	1.04
Sulphuric acid	.09	.04
Phosphoric acid	.24	.27
Chlorine	.01	.02
Organic matter	8.56	6.83
Water	2.70	4.57

From the above table an idea may be formed of the variety of materials to be found in good land.

To such a soil it would be useless to add potash, as it already contains an abundance. Were it intended to sow it in clover, which is fond of sulphuric acid, a dressing of calcium sulphate (gypsum or plaster of paris) would be a benefit: and in general it is usually possible to determine from the analysis of a soil and the ashes of any given plant, the adaptation of one for the other, or the proper manure to be added.

SOLUBILITY OF THE SOIL.—A good soil should contain in every thousand parts from five to thirty parts of soluble salts of a kind adapted to vegetation. Mineral food may be abundant, but if in an insoluble form the plant can make no use of it. To reclaim such a soil it is necessary to supply the soluble food needed either by additions of manure, lime, gypsum, etc., or by treating it in some manner so as to cause its minerals to reform themselves into new and soluble compounds.

Cultivation effects this in a measure by exposing the earthly matters

to the action of the air: clay is often much improved by moderate burning; too high or too prolonged a heat, however, is injurious: if land lies fallow, the vegetable or other acids are allowed time to act upon the minerals and decompose them: lime being a powerful basic oxide has the power of depriving weaker bases of their acids, and thus often forms soluble compounds out of insoluble ones.

The effect of lime upon the soil is deserving of special notice.

Since the acids in the soil are mostly organic, and lime unites with them to form soluble salts, it follows, and experience has shown,

a. Lime has little effect in soils poor in organic matter.

b. Organic matter disappears more rapidly with its use—exhausting the land unless its place be supplied by additions of manure. From this comes the old saying, "Lime enriches the fathers and impoverishes the children," and

"Lime and lime without manure,
Will make both land and farmer poor."

Yet lime properly used with aid of vegetable or animal manure is a great fertitizer, and its loss from the soil is due to three principal causes:

a. It naturally sinks into the subsoil; more slowly of course where the plow is used than in meadow-land.

b. Crops carry it off. *e.g.:*

One ton of wheat contains about	17 pounds of lime.
One ton of oats contains about	22 pounds of lime.
One ton of barley contains about	18 pounds of lime.
One ton of turnips contains about	6 pounds of lime.
One ton of potatoes contains about	5 pounds of lime.
One ton of rye straw contains about	15 pounds of lime.
One ton of red clover contains about . . .	35 pounds of lime.

c. The rains wash out a portion of it, owing to the acids which it brings from the air to dissolve it.

It is therefore necessary occasionally to add lime to certain soils.

ORGANIC CONSTITUENTS.—The plant food thus far considered is the mineral or inorganic portion which forms the ash, when a vegetable substance is burned. The elements of which the other or combustible portion is composed are mainly *Carbon, Oxygen, Hydrogen,* and *Nitrogen.*

Carbon (charcoal) is derived by the leaves, and to a small extent also by the stems and roots mainly from *carbonic oxide,* a gas present in the air to the amount of one-twenty-fourth of one per cent; oxygen comes mainly from the decomposition of water; hydrogen probably from the

same source and from ammonia, etc. In regard to the nitrogen in vegetable tissue the origin was for a long time in doubt; although forming nearly four-fifths of the atmosphere, plants could not probably obtain it from this source, but depended upon its compounds, such as ammonia, nitric acid, urea, etc., or its salts, nitrates of soda, potash, etc., which come partly directly from the atmosphere, but more particularly from decomposing animal matter.

Hence the importance of saving animal manures, and particularly the liquid portion (urine), which is the richest in nitrogen, and contains it in the soluble form best adapted for plant life.

The reason why manures must in most cases be used is because the crops are consumed elsewhere. Where they are consumed on the ground, and returned to the soil in the form of the excretions and the flesh and bones of the animals living upon it, the soil will retain its fertility and even gain to a certain extent.

But far the greater amount is carried off from the land, consumed elsewhere, and the effete matters discharged in the form of sewage into a stream and finally into the ocean. The land cannot endure this drainage indefinitely, but must have the loss made good in some form or other. Keeping this in view the action of certain mineral and other manures, will appear evident:—1. Mineral manures, *e.g.*, superphosphates, lime, oxide of iron, potash, soda, common salt (sodic chloride) tend either to supply some mineral needed for the ash of special plants at present deficient or insoluble in the soil, or to change some insoluble substance present into a soluble form: lime and salt seem to have this tendency.

2. The addition of nitrates or of ammonia supplies the plant with nitrogen; these substances also by their chemical action tend to change certain mineral substances into a more soluble form and thus to fit them for absorption into the roots; in a poor soil, however, they are of little value, promoting a quick growth and a light yield.

3. The addition of vegetable manure if grown upon the soil (as in the turning under of clover or rye) adds nothing to the ash constitutents. It does, however, add nitrogen obtained indirectly from the air and certain organic acids and salts which tend to render portions of the soils soluble.

4. Animal manures are similar to vegetable, but more concentrated and richer in nitrogen. In their use also there is the advantage of being able to place upon a field what is obtained from a foreign source.

ASH OF PLANTS.—There is a great difference in the chemical composition of the ashes of different plants, and the treatment of the soil should keep in view the requirements of the crop it is intended to raise.

Thus: potatoes are rich in potash, and clover abounds in sulphuric acid; potash salts should therefore be used for the former, and some sulphate, such as gypsum or plaster of paris (sulphate of calcium) for the latter.

Certain plants thrive best with animal manures; others equally well with vegetable or mineral manures. Some with high farming tend to run to straw or stalks, while others are steadily improved in grain and fruit.

It must always be borne in mind, too, that the same manure may have a very different effect upon different soils, owing to the fact that one very important use of most manures is to make soluble certain minerals which the soil already contains; and, therefore, they must be adapted to the soil as well as to the crop which is to be grown upon it.

FARM YARD MANURE should be applied to the soil as soon as possible. It is a mistake to keep it as some do for years "rotting it," as the most valuable parts, ammonia, urea, nitric acid, etc., are largely lost. The liquid portion (urine) is the most valuable and should not be wasted as is often the case. If it is necessary to keep it for some time, store it, protected from rain by a cover, and mixed with clay, or have a thick layer of clay on the floor to retain the ammonia.

BONES as manure return to the soil lime, phosphoric acid, and organic matter, all of which are valuable, particularly for wheat and other grain: the bones should be ground fine as large bones decay very slowly.

SUPERPHOSPHATES are valuable in proportion to the amount of phosphoric acid they contain. They are made from mineral phosphates by the action of sulphuric acid, and if well made form a useful manure for certain crops, but if poorly made, may be of little account.

GREEN CROPS plowed in are easily applied and often very effective. Buckwheat, clover, and rye are most commonly grown for this purpose; weeds have a similar use. The best period for plowing under is just at the flowering period of the plant, as then the foliage is most luxuriant, and the seed has not formed. The plants should not be allowed to decay in the air.

SAWDUST, STRAW, TAN-BARK and other similar fibrous substances decay slowly; their effect therefore is more noticeable after being in the ground several years.

ADVANTAGES OF DRAINAGE.—1. If a soil is constantly wet it is cold; the heat of the sun is spent in evaporating the moisture and does not warm it properly; in it seeds germinate, and plants grow slowly. A drain carries off the excess of water.

2. Clay soils when wet are stiff, difficult to work and exclude the air from plant roots. When dry they are easily worked and admit air freely.

3. When water has an outlet below, it goes down and sucks the air after it; this is of great advantage to roots and promotes the decay of manure, thus rendering it more valuable. If, on the other hand, water has no outlet below by natural or artificial drainage, the moisture rises from the subsoil as it evaporates from the surface of the ground; thus chilling the plant and checking its growth, or often bringing in solution injurious acids from the subsoil.

4. Singular as it may appear at first sight, drainage generally helps the crops to sustain a drouth; the reason for this is that in drained land roots penetrate much deeper and do not lie so near the top soil, which is parched by the sun.

5. Noxious substances or excess of saline matters are removed from the soil and subsoil by drainage.

6. The continued action of the air and water drawn by the suction which is caused by drainage gradually softens and mellows the most stubborn soils and renders them easier to work.

7. The same action warms the roots and the subsoil.

8. It carries down moisture and soluble matters quickly. So that light showers are more beneficial than when the water simply lies on the surface and is dried off by the first sunshine.

Soil has the power of retaining with great force ammonia and other soluble substances, unless the quantity is excessive, so that drainage waters carry off but a trifling amount. The tendency is, however, to carry them downward. The depth of the drain should be fixed not much deeper than the land can be worked or the plant roots penetrate, *e.g.* 20 to 36 inches. Subsoil plowing assists the drain by making a free passage for the water, *and brings* up again to the surface the saline matters carried down by the action of the drain.

MINERALS AND ORES.

For successful mining a certain familiarity with mineralogy, geology, chemistry and engineering is indispensable. In prospecting for mines, also, great assistance may be derived from the two sciences first mentioned.

A knowledge of mineralogy must be acquired through the study of minerals themselves, and cannot be gained from books alone. In examining a mineral it is necessary to notice its *hardness, color, streak, lustre, tenacity, cleavage, specific gravity, chemical composition, and crystallization.*

1. HARDNESS is the ability to scratch or mark other minerals or hard substances, and is determined by reference to a scale of hardness consisting of ten different minerals., viz. : —

1. Talc.	6. Felspar.
2. Gypsum.	7. Quartz.
3. Calcite.	8. Topaz.
4. Fluor spar.	9. Corundum.
5. Apatite.	10. Diamond.

Any mineral may have its position in the scale determined by attempting to scratch or mark it with the different substances given above, those harder than it will scratch it, while those softer will not.

2. COLOR is apt to vary greatly even in the same mineral, owing to the presence of certain impurities.

3. STREAK is the mark made by rubbing a mineral upon some hard white surface as of unglazed porcelain; it is of the same color as the powder and often differs considerably from that of the mineral.

4. LUSTRE may be described as *metallic vitreous* (*glassy*), *waxy, resinous,* or *dull.*

5. TENACITY may be *brittle* as when a mineral is easily broken in any direction; *sectile,* easily split in one or two directions, but not in others; or *malleable,* not breaking, but flattening under the hammer.

6. CLEAVAGE is the tendency of a mineral to split in certain directions; good examples of this will be found in *calcite,* felspar, mica, fluor

spar, etc. If, instead of splitting and exposing a plane surface, a fragment is struck off by a blow leaving a concave depression, such a fracture is called *conchoidal*; if it is irregular it is called *splintery*; flint and anthracite coal furnish examples of the former, quartz crystals of the latter.

7. SPECIFIC GRAVITY is the weight of a substance compared with that of water, and is found by dividing its weight in air by its loss of weight when immersed in water.

8. CHEMICAL COMPOSITION, of the sixty-three elements known the rocks are composed chiefly of the following sixteen.: *Oxygen, hydrogen, carbon, silicon, chlorine, sulphur, fluorine,* and *phosphorus,* negative elements, and *aluminum, iron, magnesium, calcium, potassium, sodium barium,* and *manganese,* positive or metallic elements.

The most abundant element is *oxygen,* after this *silicon, aluminum* and *calcium*; iron is the principle cause of the brown, red and yellow colors in the rocks.

The rarer metals are generally the most valuable; among others may be mentioned zinc, lead, tin, copper, silver, platinum and gold; of these platinum and gold are usually found *native* (in the metallic state), silver and copper sometimes native, but usually combined with some negative element, such as sulphur, while the others mentioned are always found in combination.

9. THE CRYSTALLIZATION of minerals affords to an expert the readiest evidences of its character and composition. Its study, however, is a science of itself. Most minerals of definite composition have a certain fixed crystallization *e.g.*: sulphide of lead is usually cubical, quartz, hexagonal; others rhomboidal, stellate, tabular, etc.

A mineral is called an *ore* when there can be obtained from it some metal of commercial value.

The metal or metallic compound may be disseminated through the rock in fine grains or crystals as in many gold and silver ores; in large crystals easily separated from the adhering rock, as in certain lead and zinc ores, or the entire deposit, whether earthy or crystalline, may be ore, as in the case of iron ore.

In the tables given below, the ordinary minerals of the rock are separated from the metallic ores; of the former only a few of the more abundant are mentioned, while the latter are presented somewhat more fully, and with them a number which are of no account as ore, but which might be easily mistaken as being valuable, *e.g.*: pyrite, pryrrhotite, molybdenite, etc.

COMMON MINERALS.

MINERAL.	COMMON NAME.	HARD-NESS.	COLOR	LUSTRE.	CLEAVAGE	SP. GR.	COMPOSITION	REMARKS
1. QUARTZ	Quartz	7	transparent	vitreous	imperfect	2.7	oxide of silicon, with traces of impurities, chiefly iron.	crystals hexagonal massive it is white.
	Amethyst		clear, purple	"	"			crystals hexagonal.
	Rose quartz		clear, pink	"	"			" "
	Smoky quartz		smoky	"	"			" "
	Chalcedony		white to brown	waxy	conchoidal fracture			massive and not crystalline
	Carnelian		red	"	"			" "
	Agate		band'd or cl'ded	"	"			" "
	Flint		dull	"	"			translucent at the edges only.
	Touchstone		velvet black	dull	"			used for testing alloys.
	Jasper		yel'wish brown	"	'			
2. ALBITE	Soda Feldspar	6	white or red	vitreous	perfect	2.6	silicate of alumina and soda.	
3. ORTHOCLASE	Potash Feldspar	6	white red gray green	vitreous	distinct	2.5	silicate of alumina and potash	
4. OBSIDIAN	Volcanic Spar	6.7	green brown black	vitreous	conchoidal fracture	2.7	fused feldspar	found in volcanic rocks.
5. OLIGOCLASE	Soda-lime Feldspar	6.5	white, green	vitreous	perfect	2.6	silicate of alumina lime and soda.	

6. MUSCOVITE	Mica	2.5	yellowish white to dark olive	pearly	in plates	2.9	silicate of alumina	plates elastic.
7. BIOTITE	Black mica	2.5	black, brown	pearly	in plates	2.9	silicate of alumina magnesia and iron	
8. TOURMALINE		7	all colors, often black	vitreous	none	3	silicate of alumina and soda	occurs in long slender hexagonal crystals.
9. GARNET		7	all colors, generally red	vitreous	obscure	3.5	silicate of alumina and lime	occurs in gneiss and other rocks in small 12 sided crystals
10. BERYL		7.5	green	vitreous	distinct	2.7	silicate of alumina and glucina	
11. TOPAZ		8	generally yel'w	vitreous	distinct	3.5	silicate and fluoride of alumina	
12. SERPENTINE		3.5	dark green	dull	splintery	2.6	silicate of magnesia	usually found massive and clouded in color.
13. TALC.	Chinese tallow, soap stone	1	white, light green	greasy	perfect	2.7	silicate of magnesia with some water	plates of crystals brittle and non-elastic.
14. CHRYSOLITE		6.5	green	vitreous	conchoidal	3.3	silicate of magnesia and iron	gelatinizes with hydrochloric acid.
15. HORNBLENDE AMPHIBOLE		5.5	black green to velvet black	vitreous	distinct	3.1	silicate of magnesia and lime	fuses to a dark glass before the blow-pipe.
16. CHLORITE		2.5	green to blue	vitreous	perfect	2.7	silicate of magnesia and alumina	found granular in granite and other rocks. often mistaken for copper ore.
17. ANTHRACITE	Stone coal	2.5	black	sub-metallic	conchoidal	3.5	carbon with impurities	burns leaving ash.
18. GRAPHITE	Plumbago, Black lead	less than 1	black, gray	metallic	sectile	3.7	carbon nearly pure	greasy feel, soils the fingers, found in seams in older rocks.
19. CALCITE	Calc spar Glass Tiff	3	all colors; generally white	vitreous	perfect	2.6	carbonate of lime	effervesces easily with acids.
20. DOLOMITE	Magnesian lime	4	white, yellow, pink	vitreous or pearly	perfect	2.8	carbonate of lime and magnesia	does not effervesce easily.
21. FLUORITE	Fluor spar	4	clear, green, yellow	vitreous	perfect	3.1	fluoride of calcium	ground fine and mixed with sulphuric acid etches glass.
22. BARYTE	Heavy spar	3	white, yellow, red, etc.	vitreous	distinct	4.5	sulphate of barium	generally associated with galena.
23. GYPSUM SELENITE	Plaster of Paris	2	white to brown	vitreous	perfect	2.3	sulphate of lime	burned, produces plaster of paris.

METALLIC ORES.

MINERAL NAME	COMMON NAME	HARDNESS.	COLOR	STREAK	LUSTRE	TENACITY	SP. GR.	COMPOSITION	REMARKS
1. GOLD	Gold	2.5	gold yellow	gold yellow	metallic	malleable	16-19	gold with a little silver	usually in fine grains or scales
2. SILVER	Silver	3	silver white	silver white	metallic	malleable	10.5	silver and a little gold.	heated alone does not tarnish, with a little sulphur turns bl'ck
3. COPPER	Copper	2.5	copper red	copper red	metallic	malleable	8.5	copper and a little silver	usually tarnished green and black.
4. TELLURIUM	Tellurium	2.5	tin white	tin white	metallic	brittle or sectile	6.2	tellurium silver and gold	burns with a blue flame edged with green, thick white fumes and strong odor.
5. MERCURY	Quick silver	liquid	tin white		metallic	liquid	14	mercury	same as amalgam.
6. ARSENIC	Native arsenic	3.5	tin white to gray	tin white	metallic	brittle	5.7	native metal	massive, columnar and granular.
7. AMALGAM	Amalgam	3	gray	gray	metallic	brittle	10.5-14	silver and mercury	when rubbed on bright copper gives a silvery lustre.
8. ELECTRUM	Alloy	2.5	yellowish white	yellowish white	metallic	malleable	12-16	gold and silver	from 20 to 50 per cent silver.
9. HESSITE	Telluric silv'r	2.5	lead gray	gray	metallic	sectile	8.5	silver tellurium	
10. SYLVANITE	Graphic tellurium	1.75	steel gray, white to bras'y yel'w	gray	metallic	sectile	5.7-8	gold, silver and tellurium	shows tellurium flame at high heat.
11. PETZITE	Gold tellurium	2.5	iron black	dark gray	metallic	brittle	8.75	silver, tellurium and gold	tellurium driven off at high heat leaving a globule of silver which then answers to test above given for silver
12. ARGENTITE	Silver glance	2.5	gray black	gray black	metallic	malleable	7.2	sulphide of silver	crystallizes in cubes, sprays and threads. Silver 87 per cent when pure.
13. ACANTHITE	Silver glance	2.5	iron black	gray black	metallic	malleable	7.5	sulphide of silver	crystals rhomboidal. 87 per cent silver when pure.

14. CHALCOCITE	Copp'r glance	2.75	steel gray to black	gray	metallic	sectile to brittle	5.7	sulphide of copper	generally tarnished blue and green, carries silver.
15. SPHALERITE	Blende	4	yel'w, brown and black	yellow and brown	resinous	brittle	4	sulphide of zinc	cleavage perfect, translucent if light colored.
16. GALENITE	Galena	2.75	lead gray	gray black	metallic	sectile	7.5	sulphide of lead	cleavage in cubical crystals, always carries some silver.
17. CINNABAR	Cinnabar	2.2	cochineal red	scarlet	submetallic	sectile	9	sulphide of mercury	found as a scarlet earthy mass. If pure wholly volatile. Occurs in slate rocks.
18. PYRITE	Pyrites	6.5	brass yellow	black	metallic	brittle	4.5	sulphide of iron	strikes fire with steel, sometimes carries gold — also in some localities silver.
19. PYRRHOTITE	Magnetic Pyrites	4	bronze yellow to copper red	dark gray	metallic	brittle	4	sulphide of iron	when powdered, is attracted by a magnet.
20. MARCASITE	White pyrites	6	pale yellow	gray black	metallic	brittle	4.7	sulphide of iron	crystals not cubical, generally radiate, flattened, etc.
21. STERNBERGITE		1.5	bronze yellow and brown	black	metallic	malleable	4.2	sulphide of silver and iron	silver 33 per cent, violet blue tarnish.
22. STEPHANITE	Brittle silver	2.75	iron black	iron black	metallic	sectile	6.2	sulphide of sil'r & antimony	silver 68 per cent.
23. STROMEYERITE		2.5	steel gray	steel gray	metallic	sectile to malleable	6.2	sulphide of silver & copper	silver 53 per cent, soluble in nitric acid.
24. PYRARGYRITE	Ruby silver	2.3	black red	black red	metallic	sectile to brittle	5.8	sulphide of sil'r & antimony	silver 60 per cent.
25. PROUSTITE	Ruby silver	2.75	conchineal red	chochineal red	vitreous	sectile	5.4	sulphide of silver & arsenic	silver 65 per cent, crystals rhomboidal also granular.
26. CHALCOPYRITE	Cop'er pyrites	4	brass yellow	greenish black	metallic	sectile to brittle	4.2	sulphide of copper and iron	often carries silver.
27. BORNITE		3.5	red brown	greenish black	metallic	brittle	5	sulphide of copper and iron	often carries silver.
28. FREISELEBENITE	gray silver ore	2.2	light gray	light gray	metallic	rather brittle	6.2	sulphide of silver lead and antimony	silver 23 per cent.
29. POLYBASITE		2.5	iron black	iron black	metallic	sectile brittle	6.2	sulphide of silver copper & arsenic	65 to 70 per cent silver, thin flakes, cherry red by transmitted light.

METALLIC ORES.—Continued.

MINERAL NAME.	COMMON NAME	HARDNESS.	COLOR	STREAK	LUSTRE	TENACITY	S. P. G. R.	COMPOSITION	REMARKS
30. TETRAHEDRITE (FREIBURGITE)	Gray copper	4	steel gray & black	gray, black	metallic	brittle	5	sulphide of copper & antimony	2 to 30 per cent of silver, when carrying silver is of a light gray color.
31. DYSCRASITE	Antimonial silver	3.5	gray	gray	metallic	sectile	9.5	antimonide of silver	silver 78 per cent.
32. CERARGYRITE	Horn silver	1.5	gray, green & blue	shining	resinous	malleable	5.4	chloride of silver	silver 75 per cent, cuts easily, melts readily and is soluble in ammonia.
33. CALOMEL	Horn quick silver	1.5	gray	white	adamantine	sectile	6.5	chloride of mercury	moistened with ammonia or soda it blackens.
34. CASSITERITE	Tin stone, Stream and wood tin	6.5	brown, bla'k or gray	white or brown	vitreous	brittle	6.9	oxide of tin	on charcoal with soda it is reduced to metallic tin.
35. ZINCITE	Red zinc ore	4.5	bright red	orange yellow	brilliant	brittle	5.5	oxide of zinc	thin scales deep yellow by transmitted light.
36. WILLEMITE		5.5	white, green red, yellow & brown	uncolored		brittle	4	silicate of zinc	gelatinizes with hydrochloric acid.
37. CALAMINE		4.5	whit'h, blu'h greenish & brownish	uncolored	vitreous	brittle	3.9	hydrous zinc silicate	heated in sulphuric acid it dissolves and on cooling it gelatinizes.
38. SMITHSONITE		5	white, green or brown	uncolored	vitreous to pearly	brittle	4.4	carbonate of zinc	effervesces with acids.
39. LEUCOPYRITE	White pyrites	5	tin white	black	metallic	brittle	6.8	arsenide of iron	heated gives white fumes and oder of arsenic.
40. MILLERITE	Capillary pyrites	3.5	brass to bronze yel'w	bright		brittle	5.5	sulphide of nickel	wool like in cavities of magnesia lime.
41. ARSENOPYRITE	Mispickel	5.5	silver white	grayish black	shining	brittle	6.4	arsenide of iron	heated crumbles, turns yellow or brown & emits a garlic odor.
42. ORPIMENT	Yel'w arsenic	2	fine yellow	yellow	pearly	sectile	3.5	sulphide of arsenic	burns with blue flame on charcoal
43. MOLYBDENITE		1.3	lead gray	gray or green	metallic	malleable	4.5	sulphide of molybdenum	before blowpipe colors flame yellowish green.

44. STIBNITE	Gray antimony	2.5	lead gray	lead gray	metallic	brittle	4.5	sulphide of antimony	rhomboidal crystals, melts in candle flame.
45. TETRADYMITE		2	pale steel gray	steel gray	metallic	sectile	7.5	telluride of bismuth	laminae flexible and soils paper.
46. CUPRITE	red copper ore	3.5	deep red	brownish red	sub metallic and earthy	brittle	3.8	oxide of copper	
47. MALACHITE	Green malachite	3.5	emerald green	pale green	vitreous	brittle	3.8	carbonate of copper	blackens if heated.
48. AZURITE	Blue malachite	3.5 to 4.5	deep blue	bluish	vitreous	brittle	3.8	carbonate of copper	
49. CHRYSOCOLLA		2.4	bright and bluish gre'n		shining and earthy	brittle	2.4	hydrous copper silicate	with soda on charcoal yields a globule of copper.
50. NICCOLITE	Copper nickel	5.5	pale copper red	pale brownish red	metallic	brittle	7	arsenide of nickel	contains 40 to 45 per cent. of nickel.
51. GERSDORFFITE	nickel glance	5.5	silver white or gray	gray black	metallic	brittle	6	arsenide & sulphide of nickel and iron.	contains 20 to 40 per cent. of nickel.
52. CHLOANTHITE	Cobalt glance	5.5	tin white or gray	gray	metallic	brittle	7	arsenide of cobalt, nickel and iron	contains nickel from 1 to 35 per cent.
53. LINNÆITE		5.5	pale steel gray	blackish gray		sectile	5	sulphide of cobalt and nickel	tarnishes copper red.
54. CERUSSITE	Lead carbonate	3.5	white, gray, yellow and brown	white	vitreous	brittle	6.4	carbonate of lead	when heated, crumbles and turns yellow.
55. ANGLESITE		3	white, gray or green	blackish	adamantine resinous or vitreous	brittle	6	sulphate of lead	fuses in a candle flame.
56. PYROMORPHITE		6.5	green, bro'n and yellow	white	resinous	brittle	6.5	phosphate of lead	resembles light beryl.
57. CROCOITE		3	bright red	orange yellow	vitreous	brittle	6	chromate of lead	chrome yellow.
58. HEMATITE	Iron ore	3.7	red, black, blue black	brick red	earthy	brittle	4	oxide of iron	some varieties soft and earthy.
59. LIMONITE	Iron ore	3.7	brown	brown	earthy	brittle	4	hydrate of iron	often shows a structure in layers or columns.

A rock may be formed of one or of several different minerals, *e.g.:* quartzite, or pure sandstone, is composed almost entirely of silica (quartz); granite, of quartz, felspar and mica.

In respect to their structure, rocks are classed as (1) STRATIFIED, or arranged in sheets or layers, like limestone, sandstone, etc.; and (2) UNSTRATIFIED, massive, not having such an arrangement as granite, porphyry, etc.

Stratified rocks were originally laid under water (which accounts for their structure) and frequently contain evidences of this in the fossils they contain, the impressions of shells, fishes, coral, etc.; they are now found, however, at all elevations above sea level.

IGNEOUS or ERUPTIVE rocks are those which were ejected in a melted condition from the interior of the earth, *e.g.:* the various lavas, *basalt, porphyry, trachyte, diorite,* etc.

METAMORPHIC rocks are those which were originally stratified under water, but subsequently changed by heat and pressure, to resemble an igneous rock, *e-g.*: sandstone has been converted into granite or gneiss; shale or clay, into slate; limestone into marble, etc.

As a rule the minerals of rocks are light in weight and hard while the ores of the precious metals are relatively heavy and soft; the latter also do not occur like the former, widely scattered through extensive rock formations; but mostly (1) in *veins* or *lodes* intersecting other rocks; (2) in *sheets*, sometimes called *blanket veins* or *contact veins*, between layers of stratified rocks; (3) irregularly scattered through other rocks in *grains* or *pockets*, called, therefore, *disseminated ore* or *pocket ore*, or (4) in deposits of sand or gravel in the beds of lakes or streams.

VEINS or FISSURES are cracks in the earth's, crust which have subsequently been filled with mineral more or less different from that in the surrounding rock. Veins carrying metallic ores are usually found in the older igneous or metamorphic rocks, such as granite, gneiss, etc., and in mountain regions at high altitudes above sea level. All veins probably were not filled in the same manner; as a rule, however, the process seems to have been that of infiltration. Water, filtering through the surrounding and overlying rocks dissolved out certain of their constitutents and deposited them again in the crack or fissure as the solution became more concentrated by evaporation of the water. This theory accounts for the banded structure of veins, the occurrence of large fragments of wall rock in the midst of the ore, the varying character of the ore itself, etc.

A vein may intersect the country rock vertically or obliquely; in the

latter case it is said to *dip*. The *dip* of a vein is its angle of steepest slope.

The *strike* of a vein is its *horizontal* course.

The *outcrop* is the exposed edge of the vein appearing at the surface of the ground. If the surface is level, the outcrop and the strike have the same direction; but if the surface is uneven, the outcrop will follow an irregular course when the strike is straight; it is frequently important to remember this in surveying and examining claims.

A *horse* is a fragment of wall rock found in the vein.

The sides of a vein are its *walls*; the one which overhangs is called the *hanging wall*, the other the *foot wall*.

The *fluccan* is the half decomposed rock often found adjoining a vein.

The *selvage* or *gouge* is the thin clayey layer against either vein wall.

A *comb* is one of the layers of a banded vein studded with crystals.

A *fault* occurs where one vein intersects another; the older one is *faulted* or displaced by the fact that one side of the more recent vein has slipped up, down, or to one side, thus breaking the continuity of the older vein. If, as frequently occurs, it is desirable to find the continuation of a vein on the farther side of a fault it is generally safe to conclude that the *hanging wall* of the more recent vein has slipped down along the line of the *dip*, and from this may be calculated the direction in which to search for the lost lode. The direction and extent of the fault are frequently indicated by scratches on the walls of the cross vein.

GANGUE or VEIN STONE is the worthless rock found associated with the metallic ores, the most common of these are *quartz*, *felspar*, *calcite*, *fluor spar*, *baryte*, *heavy spar*, etc. In searching for veins, the fragments of these minerals found in the gravel beds of streams, in some degree indicate the position and character of the lode from which they have come.

In case the water carrying metallic ores and gangue in solution have not deposited them in a crack or fissure, but between two layers of stratified rock instead, or between a stratified and unstratified rock, such a formation is called a *contact vein*. Veins of this character may be inclined at any angle, owing to the fact that the stratified rocks have been tilted or uplifted, and thus are no longer level, as they were originally formed. Contact veins frequently occur between *porphyry* or *trachyte* an eruptive igneous rock on one side and some stratified rock, such as slate or limestone, on the other. These veins are subject to faults like fissure veins, and sometimes the metallic ores follow the faults to different layers of the stratified formation.

When the water carrying the ores and gangue in solution reaches a somewhat soluble rock, like limestone, it will often deposit the substances in solution, taking instead part of the soluble rock. In this way ores are deposited in pockets or disseminated more or less regularly through other rock. This action of the percolating water is noticeable also in contact mines and accounts in a measure for their irregular, "pockety" character. Certain deposits in New Mexico and Southern Colorado were doubtless formed in this manner, the ores being carried down through the vertical *dikes* of porous trachyte until they could escape laterally through a soluble limestone and deposit in it their metallic compounds.

At or near the surface of the ground ores will be decomposed and broken by the action of water, frost, heat, air, etc., and being washed down into the streams will be again deposited in the sand and gravel of their beds. Such deposits particularly of gold are frequently valuable, and are known as placers, or gulch deposits.

Good mines may be found in each of these classes and the best methods of mining and treating the different ores will vary according to circumstances.

Ores of copper, lead, zinc, tin and iron are smelted to obtain the metals; gold and silver are obtained by smelting or by amalgamation, the former process being used if lead or copper compounds are contained in the ore or may be cheaply obtained, the latter if these metals are wanting.

Simple Tests for Metals.

The knowledge of a few simple tests for the valuable metals is often of service. Those given below are easily tried and require but few chemicals.

I. Gold.—Grind the ore fine and wash it in a saucer or pan with a quantity of water; pour off the lighter mud, add more ore and repeat the operation; the gold being heavier, sinks to the bottom, and when the ore has been sufficiently concentrated the gold can be seen. Add a little mercury to this residue; stir it thoroughly to bring it in contact with the gold, to dissolve it; collect the mercury by washing with water; pour it into an iron spoon, and heat over an open fire; the mercury will be volatilized, and the gold will remain in the spoon. As metallic silver and copper may also be obtained by this method, if there is any doubt as to the nature of the metal thus obtained, proceed as follows: Add about four times as much lead to the metal in the spoon, and melt them together; hammer out the piece thus obtained into a thin scale or ribbon, and dissolve in nitric acid; the lead, and also the silver and copper, if present, will be dissolved; the gold will be left as a gray powder, which shows the gold color on rubbing with a knife blade on a smooth surface.

II. Silver.—(*a.*) Select about a teaspoonful of the ore, powder fine, and heat in a glass or stoneware cup with nitric acid diluted with twice as much water. After boiling fifteen minutes let it cool and settle; pour the clear solution into another glass, and add a teaspoonful of a clear solution of common salt; a white, curdy precipitate indicates lead, mercury, or silver. Expose this to sunlight; if silver is present it will turn purplish, then almost black.

(*b.*) Take about the same quantity of ore and an equal amount of common salt, mix well together, place in a clay-pipe bowl, and roast in the fire nearly at dull red heat; cool; add a little water; heat again slightly, and stir with a clean copper wire. It will be coated with a gray film of finely powdered silver which can be rubbed off with the fingers. A clean strip of zinc will be blackened.

III. Copper.—(*a.*) Place a drop of nitric acid on the specimen supposed to contain copper, and direct against it a blowpipe flame; copper

is indicated by the appearance of a green color in the flame. Upon the same spot now add a drop of muriatic acid, and again heat in the blow-pipe flame; it will be colored blue.

(*b.*) Powder a little of the ore, moisten with a few drops of nitric acid, heat for a few moments, add a very little water, and stir with a bright iron wire. It will be coated with copper.

(*c.*) Treat a little of the ore with hot dilute nitric acid; let it settle; pour off the clear solution, which should be of a blue or green color, and cautiously add ammonia. A pale blue precipitate, soon dissolving to a deep blue solution as more ammonia is added, indicates copper.

IV. Mercury.—Warm the powdered ore ten minutes with a very little dilute nitric acid; add a little water, insert a clean copper wire and heat again. If mercury is present the copper will be coated with a gray film which brightens like silver when rubbed with the fingers.

V. Tin.—Place half a teaspoonful of finely powdered ore in a glass or stoneware cup; add to this a mixture of one part strong nitric acid and three parts strong muriatic acid; heat to boiling for twenty minutes; add water till the cup is about half full; let it cool and settle; filter through a cone of blotting paper into another cup, and place in it a strip of clean zinc. The zinc will be partly dissolved, while tin and certain other metals, if present (copper, antimony, arsenic, etc.), will separate and coat the zinc or float about in flakes in the liquid. After all the dissolved metals have been separated in this way—as may be told by inserting a fresh, bright zinc strip, and noticing if it remains bright—take out the piece of zinc, let the metals settle, pour off the liquid cautiously and drain the precipitate, being careful to preserve all of it; add a little strong nitric acid. All the metals except tin will be dissolved, while tin will be converted to a white powder. If the powder appears gray or dark, gold may be suspected.

VI. Iron.—As this is found in nearly all rocks, its ores are valuable only when the metal is present in considerable quantity—*e.g.*, forty or fifty per cent. Powder a little of the ore very fine, sifting it through fine linen; of these siftings take a small quantity (as much as can be taken on the tip of a small knife blade) and dissolve in a mixture of nitric acid and muriatic acid, as in the solution of tin ore. If the ore is good it will be almost completely dissolved, though this may take a long time to effect, and the solution will be of a dark yellow color; add water; let it cool and settle; pour off a little of the solution into another glass, and add ammonia. A dark brown precipitate indicates iron.

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